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# Psychological Bulletin

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## THE FREEING OF INTELLIGENCE\*

GARDNER MURPHY

*College of the City of New York*

To those who earnestly believe that psychology may serve this generation in its struggle for democracy and world order, no task would appear more important than the wise integration of pure and applied psychology. That, then, will be my theme. Not that I wish to review the administrative phases of this enterprise, already so long and thoughtfully studied. Rather, I shall try to approach the problem with the concreteness which the shortness of time requires, by choosing one specific example of what a unified pure and applied psychology might achieve.

The problem to which I invite you to think with me is the maximum utilization by *homo sapiens* of those amazing cerebral hemispheres of his. He has wit enough to make for himself a happy sojourn on this planet and the gradual realization of more and more of his creative powers. He has wit enough to study, to understand and to control the predatory impulses of his kind, and to enrich and magnify the impulse to tenderness and good will. Yet he foams and frets, exhorts and moralizes. A visitor observing the Roman Empire, then joining the *Little Prince* among the minor planets, and returning in 1944, might note that intelligence, as the capacity to adapt the environment to one's needs, has been only very ambiguously advanced. He would wonder why man puts only half his mind into the discovery of the solutions he needs for his problem of community living, giving many of the critical decisions to the direction of blood rather than brains. Perhaps, he would conclude, brains are not *free* to act in accordance with their potential. Intelligence is fettered by manacles whose design has been imperfectly studied.

Scientific thought, as a full-fledged device for the analysis of nature, has been with us but three centuries. If the Lord asked some modern Job, "Canst thou bind the sweet influences of the Pleiades, or loose the bands of Orion?" he might well and modestly reply, "Not yet, but I have measured the distance and the magnitude of the Great Nebula in Andromeda and have weighed the invisible companion of Sirius." Indeed, wherever the task is objective and his intelligence free, he has

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remade the order of his world. Yet on points concerning his own nature, where his impulses have beclouded the process of his thinking, he still relies upon exhorting, moralizing, and argument. He has not, in fact, studied with any great perseverance the very process of thought itself, and is only dimly aware that the discrepancy between the achievement of science and the achievement of everyday thinking is due to failure to make clear the fetters which bind the thought processes. He has hardly heard Spinoza's precept: "be not angry, and complain not, but use reason." For how, otherwise, could a species producing the achievements of a Newton, a Darwin, or a Pasteur, prove incapable of ordering the relations of men in community, in nation, or in the world pattern of civilization? The towering genius of the great scientist often lapses into childish babblings as he turns to problems in which his personal desires give structure to his thought. When the will to believe, or the will to disbelieve, rather than to observe objectively and read the scroll of nature, is the guide, the sharpest tool of thought becomes suddenly dull, the greatest of creative impulses falls into the reiteration of petty prejudice.

I would fully concede that simple economic fears, fears of the powers that be, can muddy the thinking of all men, including those classed as scientists; but I would urge a much more systematic and deep-probing study of the less obvious constraints which we unwittingly impose upon the freedom of our thought. Thought, we say, is loaded by individual personality trends, or we speak of autistic thinking. We know that the ordered process of thought exhibited in the textbooks differs substantially from the thinking which we ordinarily encounter; but as to the specific dynamics responsible for the difference, and about the manner of freeing ourselves from these impediments, we know little. For though the faculty psychology be honorably buried, the realm of intelligence still remains separated from the realm of impulse, feeling and motivation, not only in the pages of our textbooks but in most of our experimental studies. Though we dissect, measure, and factor-analyze man's intellectual powers, and pry ever deeper into his affective and impulsive life, yet even today, in an era of political bitterness and international frustration, where thinking is loaded with an unbearable freight of anxiety and unconscious distortion through wishes and fears, we have scarcely begun to lay bare and measure those impulsive dynamic relations which lie at the heart of thought.

We may trace for a moment the different paths which pure and applied psychology have followed in their study of the human capacity to think. Psychology discovered during the seventeenth and eighteenth centuries that the process of thought could be rather effectively reduced to associative laws wedded to an elementary mechanics of brain



processes. The tradition of Hartley and the tradition of Descartes were finally fused in a nineteenth-century associationism based upon sensory and motor elements arranged serially or in patterns. The problem of active or creative thought was solved by giving some elements in the associative stream a more central role than that assigned to others. The impulsive or emotional factors guiding thought were treated as secondary classes of elements arranged like the pieces of a mosaic pattern. Thought was basically an ordering of experiential items; and if at times the deeper dynamics of living appeared to confuse or distort the thought process, the distorting factors were made a subsidiary class of elements to be dealt with as a subordinate problem, in accordance with associative laws. The solution was, then, solidly intellectualistic.

Early in the present century, Gestalt psychology challenged the assumptions of associationism, turning to an emphasis upon the mind's structural properties. Intelligence was given a position of high importance, creative thought assigned a central role, because the mind was deemed capable of grasping with a single stroke the inherent order and beauty of natural objects in a natural order. But Gestalt psychology was still concerned, as association psychology had been, with the truth-seeking and truth-realizing aspects of such intellectual conquests. There was scant recognition that the mind is an evolutionary product in which the impulsive life gives quality and direction to the cognitive effort. Though many studies have been devoted by Gestalt psychologists to the nature of thought, such dynamic systems are conceived to arise directly from the structural properties of the external situation. While psychiatry on the one hand, anthropology on the other, have constantly stressed the bondage of thought to obscure, or even unconscious, directing tendencies, the implications for the experimental psychology of thinking appear still to be very incompletely realized.

*Applied psychology* has, on the other hand, been confronted throughout its existence with just those forms of thinking in business and industry, in clinic and in court, in school and in public opinion, which arise from a matrix of needs, and consequently provide major clues to the effective organization of the thought processes. Clinical psychology is intimately concerned with the distortion of the patient's world-view by affective factors in open or covert conflict with one another; while in the evaluation of the patient's intellectual resources the clinician observes the limits imposed upon the patient's intelligence by his need to see, to learn and to think in accordance with his drives, exhibiting a functional level of intelligence far removed from the measured capacity revealed by any test. Similarly, studies of industrial conflict have shown that injured egos and blind stubbornness can daily break the fine thread of understanding which practical self-interest and human reasonable-



ness have tenuously spun between management's and labor's viewpoints.

Here, then, as I shall try to show, is a supreme opportunity for an integrated psychology, dealing with the whole human being, to develop in a direction permitting the thought patterns of mankind in their natural setting to contribute to the understanding of the dynamics of thinking, while the psychologist of the laboratory, reaching to meet him, strives to integrate such findings within a single systematic effort.

### AUTISM

Let us attempt a more systematic statement of what we know today regarding the relation of our needs to our processes of thought, and of the directions in which research may prove fruitful, if intelligence is to be free to do its task.

We may conceive the brain as continuously receiving afferent impulses of exteroceptive, interoceptive, and proprioceptive types, ordered and integrated in individual life experience. The brain has no system of Wratten filters by which to operate on the basis of the external factors alone; as an evolutionary organ, its task is integrative, not dissociative.

This gives us Sherif's conception of perception as jointly determined by external and internal factors (19), an ordered result being achieved in which the personality disposition plays its part, in bi-polar fashion, jointly with the properties of the outer stimulating situation. Some of the interoceptive determiners are easily located by experiments showing that hungry subjects interpret neutral stimuli as food, while some of the proprioceptive determiners are suggested by experiments classified as studies of the influence of set or of attitude. Some of the most important factors appear to be inner tensions of considerable complexity, involving needs developed under social pressure. Thus, in one of Sherif's experiments in which a trained and an untrained observer worked together (20), it became clear that the insecurity of the untrained observer, the need to see as a trained observer did, was the chief dynamic factor involved.

The study of electroencephalography has added to the accumulating evidences that the cerebral cortex is in a continuous state of dynamic adjustment, exemplifying a continuous process of active adaptation to stimulation from the external environment and from inner activity. The percept, or the thought, develops as an organized response to a matrix of stimulation, in which the structure of the environment and the structure-giving tendencies of the perceiver converge in the determination of a unitary response. The external pattern is sometimes so rigidly structured that personal factors in *perception* may be minimized; but even here the personal factor is easily detected and measured when *recall* is tested, and it is more salient still in the case of *creative thought*



(2). As far as we know, there are no cognitive responses which are completely free from the control of motivation. To be sure, the tension system within the cortex may be less conspicuously dependent upon visceral conditions at one time than at another, and we must emphasize that in all the higher mammals there are many needs which are relatively independent of visceral conditions, depending apparently upon neuromuscular tension systems of a complex order. But this does not alter the fact that thinking is an active and directed process, in which needs determine both the point of origin and the direction of trend within the cognitive activity.

I will of course agree that cognitive processes are guided by habit, too; and I would stress under the term "habit" the naive response to irrelevant cues or analogies. Piaget's studies (15), confirmed by Lerner (10), Dennis (5), and other workers, point to the great importance of primitive habit, especially thinking by analogy, a result confirmed in contemporary projective studies of childhood thinking. But I should follow Abel (1) in stressing that these same primitive thought patterns are found abundantly in normal adults. What James Harvey Robinson called the "history of the human mind" is largely the history of the transmission of socially sanctioned primitivisms. But I should be unwilling to admit that habit can be distinguished from motivated behavior; I would emphasize that habits become ingrained by *serving needs*, and that they die out, become extinguished, disintegrate, when the drive that underlies them fades away.

If we now set out to order the specific relations of cognition to the life of impulse, we might schematize the steps as follows:

First, at a sheer descriptive level, perception, recall, and thought tend to take a direction such as to bring to the individual a cognitive situation satisfying to his needs.

Second, this movement of cognitive processes in the direction of need-satisfaction is often unconsciously directed, the individual achieving a wish-fulfilling end by steps which do not betray to him the origin of the impulse which he follows. This appears to be simply because one of the needs is to keep himself happy regarding his own motivation. In the cases reported by psychoanalysis, the individual reaches his goal, remaining unaware that the pseudo-logical steps taken serve an unconscious need.

Third, that cognitive processes move towards need-satisfaction appears to be a special case of the law that *behavior in general* moves in the direction of need satisfaction. I refer here to the whole mass of data on the psychology of learning which, however phrased, define the customary elimination of the frustrating aspects and the fixation of the satisfying aspects of behavior processes.



Fourth, as to perceptual dynamics, it would appear that relatively unstructured perceptual situations are given structure in terms of *figure and ground*, by virtue of the fact that those elements stand out as figure which have previously been present as aspects of satisfying situations. The series of experiments from the Harvard Psychological Clinic (14) are, I think, convincing here. Thus personal needs serve to throw some elements of a visual or auditory pattern into the role of figure, so that one sees or hears what one needs to see or hear. This tendency is developed through learning; a designated aspect comes to serve as figure, if that aspect appears repeatedly in a satisfying situation. The Rorschach test similarly shows the tendency towards one or another perceptual habit, partly in terms of the sheer contents which are satisfying to particular observers, partly in terms of a deeper dynamics in which the impulsive or affective needs of the individual anchor upon one or another aspect of a relatively unstructured field. During the processes of perceptual shift and during the processes of recentering which occur in thought, the same process appears; from a complex of experience elements, those stand out which are aspects of a satisfying pattern, each phase being partially determined by the thinker's syndrome of needs. A little later I shall try to show how large a part is played in thought by those needs to which we usually refer under the term "curiosity" or the "exploratory drive." As a general principle it appears enough to say that thought, like perception, is bi-polar, the dynamics of figure and ground deriving jointly from the structural properties of the stimulus situation and from the need-patterns of the individual.

In view of this preliminary analysis, it should be clear that not only the wish but the fear may be father to the thought. In many learning situations, autism derived from fear may be repeated and fixated. The impulse to perceive the nature of the threat is activated by the need to escape; this appears to be a way of coping with threats developed through earlier experience with such threatening situations. In anxiety one may repeatedly recall that which has brought on the greatest distress.

Another suggestion, formulated and tested by Chein (11), is useful in explaining why the relation of drive to autism is not linear. For some hours after partaking of food, subjects showed more and more tendency to perceive food as they looked at indistinct colored and uncolored figures presented behind a ground-glass screen. But there came a time with every subject when, with increasing hunger, the trend was reversed and there was less and less tendency to perceive food. With the more realistic colored cards this trend set in earlier. Chein observed that the impulse toward reality which was temporarily weakened had begun to assert itself. After some hours of food deprivation, the impulse



to see food autistically becomes less effective in competition with the drive to face the whole reality, and to leave the situation in quest of actual food. Here, then, in Chein's remarks is a suggestion as to the quantitative study of the relative strengths of two drive-determined tendencies. This sort of quantitative analysis points to the temporal relations of particular types of autism; our aim might ultimately be the detection and quantitative study of the pattern of autistic trends within any individual perceiver. The first problem today, however, would appear to be the discovery of the specific conditions which give rise to fear autisms on the one hand, wish autisms on the other.

We have emphasized that autistic responses are learned responses. Since these steps in perceptual development are like the steps in motor learning, we shall perhaps ultimately find that the dynamics of autistic cognition are the same as the dynamics of the motor learning processes, that the perceptual world is conditioned and molded as is the behavior world. If research reaches such a point, it would make applicable to the psychology of thought everything we know about the psychology of learning. Whether this would support a motor theory of consciousness, I do not know. But it would seem likely that perception, and the cognitive life in general, arises from the same type of genetic dispositions, is moulded in the same way by the learning process, and eventuates in a form governed by the same ultimate laws as motor behavior.

It may be objected that all such studies have to do with thought encumbered by complications, that despite such complications, the bare, primordial form of intellect remains as a matrix or substrate. There is conceived to lie, beyond all these deviations, pure intellect *qua* intellect. Now indeed if pure intellect is to be found, we should go to the ends of the earth to find it. Pure intellect, free of all personal autistic deviations, would be the pearl of great price, the discovery of which would constitute a master stroke not only for psychology but for civilization. Where, then, is this pure intellect, this Faustian homunculus, this little gem of rationality to which we strive to gain access in our experiments in the psychology of thought and in our metrical analysis of intellectual functions? Possible approaches to its discovery might appear to lie in rigidly controlled laboratory research; but here we have found that cultural and personal variables have consistently affected not only the amount but the very structure of the process of thinking. Or we might seek it in early childhood; but here thought occurs as an aspect of a type of global effortful contact with the world in which the non-rational and the egocentric mark the process and the product. Or we might seek it in the works of pure genius; but here the biographer and the historian have consistently pointed to the impress of personality upon even the most logical ordering of scientific relationships. There is, we sadly conclude,



no such pearl of great price, no intellect which stands apart from the concrete personal, drive-directed efforts at contact with reality. There is no "pure" intelligence at all.

When one looks at the process of thinking in this way, seeing the impress of personal tensions and the resulting personal ways of thinking at every phase in the development of the mind, many of the formal problems relating to intellect take on a very different appearance. An example is provided by our bitter struggle over the nature-nurture question as it relates to intelligence quotients. Intellect has been conceived on the one hand to lie dormant as a potential within the germ cell, waiting only to be nursed into expression. It has, on the other hand, been conceived to be the impress of a system of social arrangements mediated to the growing individual. Studies undertaking to evaluate the relative contributions of variance in nature and nurture have yielded the ambiguous results likely to characterize statistical treatments when theory proceeds in confusion or from contrasting frames of reference. Some clarification has come from the many hints that the influence of superior environment may lie partly in the qualitative and quantitative transformation of abilities as a result of the arousal of the child's interests, the development of tastes, and the specific forms taken by the "will to learn"; the drive structure of the child gives direction and expression to his measurable intellectual powers. As Sears (18) has put it, "Within rather wide limits the essential factor determining whether the subject's motivational (affective and attitudinal) peculiarities will cause significant deviations of psychometric performance seems to be what the test situation means, consciously or unconsciously, in terms of this particular subject's individual patterning of complexes and desires." In the light of such observations, it appears likely that in relation to intellectual tasks there are two levels at which personality variables may operate: (1) they may give structure to that which reaches consciousness; (2) they may, through fear, completely prevent the mind from making contact with certain specific stimulus materials. Inhibition or blockage, as in the case of reading disabilities and in the case of data of the type reported by Sears, may appear when there is a profound emotional incapacity to give the mind to the material at all. Conversely, we should expect that a positive love of certain stimulus materials would give a better-than-average opportunity for close attention to it, with a likelihood of achieving greater "resolving power" in relation to it. Autism, the movement of cognitive processes in the direction of need-satisfaction, involves, then, both the figure-ground patterning of given situations and also the crippling or the enhancement of mental functions in accordance with conscious or unconscious drive-patterns.

The comment has cautiously come that perhaps the influence of



motivation in directing the processes of thought may play a part in the differential rates of growth among the different *kinds* of intellectual capacities, the mind being progressively sensitized to specific aspects of the environment which take on meaning for the individual. Perhaps when the data permit us to understand the qualitative changes wrought in intellectual functions by various kinds of influences, and to measure their amounts, we might go on to ask about their gross aggregate in the form of intelligence quotients. We can hardly expect to understand mentality as a whole until its specific expressions have been accurately observed and measured in the growing individual.

#### SOCIALLY SHARED AUTISMS

I have not meant to imply that autistic responses necessarily separate a man from his fellows. On the contrary, it is characteristic of every social group to develop its own socially shared autisms. There are very clear, consistent, and well-organized pictures of Christian Scientists in the minds of good Roman Catholics, and of Mormons in the minds of good Presbyterians. These pictures have been built up through a great deal of consistent social sharing. They are far indeed from personal autisms. They are, on the whole, more refractory to evidence than are the personal autisms. They do not, however, permit commitment of their possessors to institutions, since none would remain outside; the very collectivity of the autistic frames is regarded as evidence of individual sanity. By and large, more cognitive distortion is achieved through socially shared autisms than through psychotic processes within the individual. By a mechanism which Stefansson (22) has described in the brilliant phrase "the standardization of error," it is possible for human beings to achieve an amazing clarity of viewpoint which springs not from contact with reality but from the need for protection from surprises and ego injuries. And in accordance with Sherif's suggestion that the more unstructured the perceptual field given by a situation, the greater the role of autistic elements, the danger of destructive autisms is peculiarly great in relation to matters of social living. The world of social immediacy—frequently the world of the unstructured, the confused, the rapidly changing, the world of uncertain norms and of value conflict—is a world in which autism reigns supreme.

Unfortunately we ourselves have no immunity from this principle. The socially shared autisms of Americans constitute an example of the sort of thing with which our peace-makers might well be concerned. No casual study of international relations will make clear to an Englishman, a Russian or a Chinese why we are so certain regarding the essential infallibility of our institutions. We may show much tolerance and say many fine things about our allies, but the glasses through which we



look as members of an indoctrinated group are something to which we can never really be intimately introduced; for our defenses are too good. We are only today groping towards techniques by which the common autisms of conflicting or cooperating groups may be fully explored and measured.

And though we may smile at the autisms of the layman, social psychology, in company with all the social sciences, suffers acutely from autisms. Thus it is not merely the lack of precision-measures which makes the social sciences fall short of the mark as full-fledged sciences. Thought works here with relatively unstructured material; it is likely to reflect the autisms of the specialist. The possible contribution of social psychology to human life can hardly be discussed without recognizing the two-fold difficulty which besets us. For while obstacles stand in our way with regard to controlling this external structure, we are neglecting the more immediate obstacles, namely the autisms of individual social scientists, including social psychologists.

Could social psychology and its kindred social sciences discover a framework in which perceptual realities could be ordered with less autism, we might discover that it is not simply the complexity of the task which makes an acceptable world order so hard to organize. It is doubtful whether world order is really more complicated than the wavicle theory of light, or more difficult to achieve than the reduction of gravitation and electro-magnetism to a common formula. The hard thing is to get a group of social scientists to mobilize their intellectual powers on the basis of problems as such. How much easier it is, like Luther, to nail our precious beliefs to the door as something to defend.

But it is not simply social psychology, it is all psychology which is autistically structured. In a rationalistic era the psychologist believed that he had only to look with reason's eye upon the processes which determined his own conclusions. Later one might marvel at the furious controversies among early German experimental psychologists, but conclude that on certain issues some one was maliciously distorting the facts. The associationist could scarcely recognize that the whole effort of psychology springs from dynamic grounds, as do all other efforts, and that wish-fulfilling factors have been involved in the choice of problems, in the setting up of methods, in the evaluation of results. As long as it can, psychology has kept the blinders on with reference to issues which do not fit the cultural temper.

American psychology has developed upon this base a peculiarly rich, subtle, brittle, and dogmatic outlook as to nature and as to human beings and how their minds work. As members of the western cultural group, we are not only out of touch with oriental psychology, but doubt whether the experience of those unfamiliar with western science has any-



thing important to offer. When Behanan (3) offered us his little book on Yoga, we accepted it as a tribute to the fabulous East. But how many American laboratories found his sober account of oriental practice useful in comparison with Jacobson's (9) and Max's (13) studies of muscle tensions and their relation to ideation? Moreover, the different psychologies which have arisen in the various countries of the western world differ not so much by way of contradiction as by way of imposing upon the data different types of figure-ground organization; and the provincialism of American psychology prior to the 1930's has been reduced not so much by boldness in asking what psychologists of other lands have discovered as by the fact that the European situation disgorged upon our shores a number of psychologists with such power and eloquence as simply to command our attention despite our hesitation. Our own autisms, both positive and negative, have been responsible largely for the historical shape which psychology has taken. To move fast in an era which needs us so much will require a merciless searching of the autisms of today.

Similar to the history of the conflict of warfare between science and religion is the history of the struggle to resist new thought forms which new inquiries into nature have created. When Mesmer came to Paris he presented two problems for a scientific answer, the nature of his cures, and the question of animal magnetism. The scientists of the day seized upon the problem of magnetism, and disposed of it. They were not, however, sensitized to the psychological problem of the cures, and did little with it. The long struggle of Elliotson to get the phenomena of hypnosis under scientific observation led to the same result; the problem of magnetism was handled with dispatch, while the problem of the cures, not fitting into the frame of reference, was evaded. When, finally, James Braid made the classical mistake of concluding that hypnosis was largely due to specific muscular fatigue, and thus found a way of phrasing hypnotic phenomena so that they would not disturb the serenity of medical men, the mistake had its share in leading to the acceptance of hypnosis as fact. Braid later showed that muscular fatigue did not explain the results; but in the midst of his positive contributions he had committed the kind of error required to make the phenomena assimilable to the prejudices of existing science, and the trick was done.

If I may permit myself a small prophecy, I would venture that the many independent experiments upon paranormal psychological processes now going on in Britain (e.g., 4, 6, 21) and America (e.g., 12, 16, 17) under the rigid experimental and statistical controls which are today properly demanded, cannot be assimilated, nor even noted, by American psychology until some generous soul, in the manner of Braid, phrases a theory which integrates the results with the existing psychological



frame of reference. The new theory will probably be an amiable error, as was Braid's, but when once the profession has begun to study and to repeat the experiments, the theory, like an afterbirth, can quietly shrivel away.

The physicists have discovered a superior way of handling unsimilable ideas, "outrageous hypotheses." They have learned since Faraday's time, as every year brings discoveries which just don't fit into classical physics, to invent mathematical descriptions which simply denote what the evidence reveals, treating events of the older physics as one special class of events comfortably housed within the vast mansions of the new. The local autisms of the physicist have in large measure been washed away by a stream of mathematical symbols. In fact, most physicists do not seem interested in defending any final world view. In the open spaces of mathematical invention there is no such constraint. And the odd thing is that this kind of free thinking pays the hugest dividends which any scientific effort has ever yielded.

#### CURIOSITY

If one accepts the broad conception that thought, like everything else in life, reflects the dynamics of motivation, there is likely to arise a word of despair, concluding that if this be so, there is no truth, there is no science, there is only the realization of satisfactions. Yet this, I think, is a naïve conception of human nature and indeed of animal nature generally. For it is because thought makes contact with reality that it has appeared in the course of evolution. Sense organs may not mediate the *ultimate* reality, whatever that may be, but they do mediate the first reality with which adjustment is made. Paraphrasing what Marx said to the idealists, "We do not know what reality is, but we can adapt it to our needs." There is truth, and there is science, as exemplified by physics and by medicine, which are not only immediately useful but which surely suggest that we are more in touch with reality than we were three centuries ago. For the sense organs and the brain are developed as a reality-mediating system of tools; and the bi-polar organization of perception is always anchored partly upon the structure of an external world with which we must deal.

But there is an additional factor guaranteeing the integrity of the scientific enterprise. There is not only a good system of receptors; there is also a powerful positive motivation to make contact with reality; this motivation is frequently more powerful than any personal drive which might lead to escape from such adaptation. For creatures like ourselves it is necessary to keep sense organs and brain in contact with the world, constantly varying the perceptual pattern just as we constantly vary the motor adjustments, making sure of the utmost use of



the tools of observation by which each pattern is constantly checked against other information. This is a way of saying that the curiosity impulse is one of the most powerful, one of the most difficult to assuage, that man possesses. It is characteristic of primates to explore about rather than to stop to digest the convenient banana; and it is characteristic of boy and girl to pry into matters to see what makes them tick. I suspect, following Holt (8), that curiosity probably arises from such primordial tendencies as perseveration and the circular response. But whatever its origins, the impulse increases with the development of intellect. And this impulsion may lead to the structuring of socially verifiable and socially shared experience, for example in the form of the sciences.

As Wertheimer so earnestly insisted, it is the nature of man to lean hard upon the external structure-giving aspects of reality. He *needs* contact with reality even more than he needs escape from it. He can develop such a craving for contact with reality as will sweep away personal autisms and the smug sense of cultural rightness. If this analysis be sound, the curiosity motive would apparently serve, as other drives do, to determine the figure-ground relationships of perceptual patterns. Curiosity would throw some aspects of the stimulus into relief. The curious mind constantly sees new figure-ground possibilities, and this is why, as a probe of reality, it far surpasses the petty limitations of ordinary autism.

Immediately we ask: what aspects of a pattern yield the *true* figure? May not the same pattern of phenomena lend itself to different types of structuring? Yes; a composite phenomenon presented to people with varying types of curiosity will lead them in varying directions. Different cultures, and different individuals, dealing with the same perennial phenomena, have made sense of them in different ways. The cooperative venture of science serves in some measure to integrate the individual curiosities of individual scientists.

But curiosity in this sense is not only general. It is also specific. The small child shows not only the will to know, but the will to know some things rather than others, the bending of the mind in this way rather than that. These variations in curiosity share in the determination of intellectual limits to be achieved by the individual in the different fields of its application, just as the cultivation of intellect consists largely of the cultivation of the thirst for contact with reality. The individual's personality determines, together with his inherited wit, how far he may go. There is no easily definable limit to the depth to which the individual may immerse himself in material which he loves, no limit to the power of the mind to saturate itself with that which satisfies it. This is no plea against the recognition of constitutional inadequacies, and no



plea against the biological improvement of the human stock. Rather, beginning with whatever the stock permits, it is a plea for recognition that not only accidentally acquired tastes, but the mind as a whole is moulded by that with which it makes contact; for every sensitization of the creative life is quite literally a gain in intelligence.

Now such curiosity is highly contagious, and civilization has been built largely by socially transmitted demands for specific kinds of understanding. Modern students of the Greek City State stand amazed at the profundity reached by the run of leisure-time inquirers, who sought from their teachers the answer to ultimate philosophical questions. Crude though their science was, limited as was their awareness of the place of man in Nature, they had an amazing capacity to perceive and attack problems of great subtlety and complexity. Just as the mind of the artist was moulded by a Phidias, the mind of the dramatist by a Sophocles, the mind of the young philosopher was moulded by a Protagoras or a Socrates.

This fine whetting of the intellectual blade is a socially continuous process, not simply an individual achievement. In the same fashion, the student of experimental science goes today to a laboratory where a great tradition has been established, that his mind may take on the mould of those who have built the tradition, just as the ambitious violinist goes to study with those who stand in direct descent from the great Paganini. In this sense the dynamic mould of intellectual function is the precious achievement of each cultural group, not simply a distortion imposed by cultural limitations; and the moulding of the mind in the direction of impelling objectivity and insatiable curiosity into the ways of Nature is one of the most priceless gifts which modern society can give its children. What we need chiefly to fear is that such curiosity may be narrowly limited to specific subject matter, when the mind during the formative period has known the delights of free inquiry only within one domain. The generalization of curiosity is, however, just as practicable as is the generalization of any other attitude, provided it be not left to chance, but systematically encouraged. The struggle of the mind to keep itself free from every sort of bondage, to remain curious, open, unsatiated in all its relations with Nature, is ten-fold more difficult than the cultivation of a stable, satisfying point of view, but a thousand-fold more precious.

#### RELAXATION

Thus far, I have praised the active life of curiosity, and have not hesitated to speak of the *struggle* for contact with reality. But there is another approach. We of the West are prone to forget that water quietly freezing can burst a granite that no sledge hammer can crack.



There are latent creative powers which wait to move forward to their work when freed from the restless downward pressures of the alert mind; creative powers which spring into being when once the narrow, nervous, preoccupied world of waking activity steps aside in favor of a quiet integration of all that one has experienced; when one is willing to let the mind leave harbor and travel fearlessly over an ocean of new experience. Under profound relaxation there are some impulsions which wield a benevolent despotism over thought which the whip of concentrated attention cannot control; thinking is still motivated, but motivated with less immediacy in relation to the tasks of the surrounding world. The historical record of creative thought and the laboratory report of its appearance today are equally clear that creative intelligence can spring from the mind which is not strained to its highest pitch, but is utterly at ease.

Indeed, as Hollingworth (7) showed us twenty years ago, the finer instruments in intellectual analysis are better understood when their counterparts are discovered in the humble occurrences of the dream. His conception of a system of cues reintegrating old patterns, or predisposing towards one rather than another new pattern, has facilitated the application of all the resources of association psychology to the study of thought. Particularly important was his insistence upon the world of reverie as possessing a richness and a complexity in the light of which the ordered processes of realistic thought become simply a special case.

On one point, I think we may today go further than Hollingworth. We have begun to realize that it is characteristic of fantasy to be more *creative* than is logical thought, in the sense that more cues are woven into the composite texture determined by many needs; in the same way the dreams of the night, starting from a complexity of individual determinants, achieve not simply a bizarre but in many respects a highly creative end-result. There is a tendency to overlook the real implications of the psychology of the dream, particularly if one is concerned solely with the therapeutic problem of the unconscious wishes portrayed in the individual case. More important for psychology as a science is the creative character of the dream itself, realizing, as in Coleridge's *Kubla Khan*, a power and an intensity to which waking fantasy is usually alien. This is not because the dream revealed fewer of Coleridge's interests or needs; rather, because more of them were free to pool their energies, to integrate their contributions. The dream gives us, as in a natural laboratory, a device for introducing more personal variables and consequently a richer permutation of end results. It would follow that a more systematic experimental study of the dream might give us a wider view of its creative potentialities, oriented to more aspects of reality than waking life can afford to recognize.



One aspect of our practical Americanism, our surviving frontiersmen's psychology, with its emphasis on wide-awake alertness and with a touch of Calvinistic devotion to immediate duty, is a suspicion of all these mental states which seem, according to the standard, not to "get us anywhere"; a general disvaluation of the relaxed, the casual, and the exploratory. The dreamer awakes from an extraordinarily vivid, realistic, intriguing dream, an experience which, if encountered in a novel or a play, he would cherish as a new avenue to the meaning of life. "A funny dream," he yawns, and by the time he has his nose in the morning newspaper he has forgotten it. To disvalue the dream is to prove oneself a sensible man.

One state is perhaps still more important, because it can be better controlled, namely the hypnotic state, in which there has recently been a marked increase in interest. The great utility of hypnosis lies, I believe, in discovering that imaginative richness, that creative power, that capacity to knock down and reassemble the ingredients of life which constitutes independent, unconventional, non-routinized, original thought. The hypnotic thought may indeed be trivial if the individual experimenter so expects. But because we live under a profound cultural disvaluation of all mental states but that of rapt alertness, the fact that we have here a markedly less constrained and more creative type of intellect has infrequently attracted our attention. Perhaps the experimental use of hypnosis may lay bare the impediments, the blind spots, the personal autisms which encumber the intellectual powers of the subject, may lead to a more focussed integration of the associative resources which lie in the background of his mind. Robert White and his collaborators (23) have made this point with surpassing skill. In summarizing experimental evidence that subjects under hypnosis remembered meaningful material much better than they could when awake, they remark: "Relaxation itself, nevertheless, has something to do with the betterment of recall. Most people are accustomed to regard alert, volitionally sustained attention as the best of all possible mental states, so that they are surprised to think that the mind sometimes works better when left a little to itself."

I believe, then, in summary, that there is evidence that functional intelligence can be enormously enhanced, first by the systematic study and removal of individual and socially shared autisms, second, by the cultivation of curiosity, and third, by the art of withdrawal from the pressures of immediate external tasks, to let the mind work at its own pace and in its own congenial way.

There are probably other important principles which I have overlooked. But the time is favorable for a thorough study, by every means and through every approach, of the processes by which intelligence



works, to the end that its potential be no longer stifled and frustrated, but utterly liberated. Perhaps the major contribution which psychology can make to this generation is to show how intelligence may be freed of the incubus which sits upon its chest, and to enable a free intellect to cut through the hideous confusion of today.

### THE NEED FOR HELP FROM APPLIED PSYCHOLOGY

I have attempted in this hour to give one example of a problem in which academic psychologists have dire need of help from their colleagues in all the applied fields, a problem in which we can expect only limping progress as long as we remain apart.

It is the universal experience of clinical psychologists, of industrial psychologists, and of public opinion analysts that the thought processes of their clients or subjects are loaded with the personal autisms of daily living. It is not thought of an Aristotelian type, but thought as a tension-reducing mechanism that appears in domestic conflict and in political controversy. Tragically, the storehouse of material here obtainable, though daily written up or discussed in conference, remains to this day almost completely opaque to the pencil of light which laboratory studies of the thought process may introduce, while laboratory psychologists must often look pitifully about to find controversial questions which may be mimeographed and presented to students in the hope of getting something real enough, hot enough, to evoke the flaming outline of a true autism. Perhaps this is because the experimental psychologists were in the first place taught that science was concerned only with those things which happened in a quasi-impersonal situation. As Mark May suggested, laboratory subjects were requested to "park their culture outside." Our predicament is like that of some unhappy geologist who, though trained in the chemistry of rocks and in the physics of erosion, might in the badlands of South Dakota despair at the prodigality with which nature has thrown about her sandstones, in evident unconcern for the precision approach which it would be so convenient to use. It is assumed among geologists that laboratory and field observations are integral, not independent aspects of their effort. For the most part, however, the field observer in psychology suffers from a sense of remoteness from laboratory inquiry, as well as from a limitation of prestige. For him field inquiries lack the dignity of science; and unless he can improvise the methods himself, he is unlikely to see how to integrate them in a scientific procedure.

There remains the danger that within the new structure of psychology the various divisions will maintain their separate abodes, like the many independent apartments within the "long house" of the Iroquois Indian, or of the Manhattan Islander, instead of constituting the



various aspects of one substantial mansion, all rooms of which contribute to the adequate housing of a unified scientific enterprise. The danger is that the psychology of thought remain in one room, protected by the aegis of experimental and theoretical psychology, that the psychology of autism as observed in public opinion polls be kept in chaste isolation in another room, that the vagaries of human thinking as they occur in clinical practice serve as museum pieces in a third apartment. The actual unity of the human thought process would be lost. Only that type of unification of pure and applied psychology which would fractionate the *administrative* tasks to be performed, but not the organic unity of the human being, would serve to the advancement of psychology. That type of fractionation which would cleave and sunder the human being into pure and applied functions, or pure and applied areas of activity, could easily prove retrogressive. If the clinical or business psychologist or the public-opinion investigator can discover problems of broad and profound significance, these must be presented where people with laboratory facilities can see and understand them; and if the laboratory psychologist discovers new principles which he believes should have social usefulness, he needs an audience sympathetically attuned to such a presentation.

This has implications as regards the programs which may be set up by the new divisions. But it has deeper implications, relating to the training of psychologists. For if psychologists in training conceive themselves to be laboratory psychologists, clinical psychologists, or public-opinion analysts, they have already built up a picture of themselves, an ego structure which will make certain types of psychological findings unassimilable to them. The time for them to obtain a vision of psychology as one great inclusive discipline, and to get a complete work-out and opportunity to grow mature both in the laboratory and in field experience with human problems, is the time of their first youthful assault upon psychology. Let us hope that their curiosity into human nature will be so unbounded, and so free, that despite later specialization they will always remain genuinely curious about everything that human nature has to offer.

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## PSYCHOLOGISTS' PREFERENCES FOR DIVISIONS UNDER THE PROPOSED APA BY-LAWS

ERNEST R. HILGARD

A ballot prepared by the Joint Constitutional Committee of the American Psychological Association and the American Association for Applied Psychology was mailed through the facilities of the Office of Psychological Personnel to all American psychologists, regardless of society affiliation, early in 1944. The ballot, entitled *Survey of Opinion on the By-Laws Proposed for a Reorganized American Psychological Association* consisted of three sections, the first devoted to the divisional organization, the second reporting the present affiliation of the respondent, and the third calling for general comments, criticisms and suggestions on the proposed by-laws.\* This report is concerned with the preferences indicated for divisions.

It is appropriate that these divisional preferences be re-examined at this time, because, by action of the two societies at their meetings in September 1944, the Joint Constitutional Committee is charged with proposing to the membership suggested modifications of the divisional structure which appeared in the edition of the by-laws prepared in June 1944 and adopted at the September meetings. It was the sense of the meeting that the number of divisions be reduced through combining those showing the greatest amount of overlap. The material presented here will be used by the committee in its further deliberations.

The divisional preferences are of considerable interest apart from their relationship to the organizational problems of the psychological associations, since they reveal a good deal about the psychologist's picture of himself in relation to his profession. Because most of those who replied checked a number of divisions, it is possible to determine significant interest clusters. The relative frequency of choices indicates trends within the profession.

Instructions relative to the checking of divisional preferences were as follows:

Indicate by a *single check* all the divisions you might wish to join if such divisions were established, and by a *double check* the division of your primary choice. Write the names of possible additional divisions in the blank spaces and check in the same way.

There followed the following 19 divisions, and three additional blank spaces:

1. Division of Abnormal Psychology
2. Division of Animal (Comparative) Psychology
3. Division of Business Psychology

\* A copy of the ballot is to be found in the *Psychological Bulletin*, 1943, 40, 646 f.



4. Division of Child (Developmental) Psychology (incl. Adolescence)
5. Division of Clinical Psychology
6. Division of Consulting Psychology
7. Division of Educational Psychology
8. Division of General Psychology\*
9. Division of Industrial Psychology
10. Division of Measurements and Statistics
11. Division of Military Psychology
12. Division of Personnel Psychology
13. Division of Physiological Psychology
14. Division of Public Service
15. Division of Social Psychology
16. Division on the Teaching of Psychology
17. Division of Theoretical, Systematic and Historical Psychology
18. Society for the Psychological Study of Social Issues (if a Division of the APA)
19. Psychometric Society (if a Division of the APA)

The names as they appeared on the ballot are reproduced here, because the wording of the titles undoubtedly influenced choices in some cases. In the tables which follow, divisions are identified by the adjective used in alphabetizing them, in the case of the first 17 divisions, and by society initials or abbreviated names in the case of the last two.

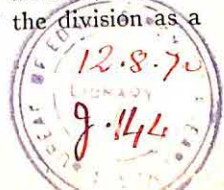
Some 6,000 ballots were mailed out. These went to many persons not affiliated with the major societies, whose names were obtained from the Roster of Scientific and Professional Personnel and other sources. The 3,680 usable ballots returned represent the preferences of a substantial proportion of active psychologists. Membership in the American Psychological Association in 1944 totalled 3,806; the American Association for Applied Psychology included but 80 more who did not belong to the APA. A summary of ballots returned is presented in Table I.

TABLE I  
TOTAL VOTES TALLIED

	Number	Per cent
Ballots with single primary choices among listed divisions	2677	73
Ballots with write-in divisions as primary choices	114	3
Ballots with multiple primary choices	365	10
Ballots without primary choice (single checks only)	524	14
Total completed returns	3680*	100

\* There were in addition 75 ballots returned without votes for divisions. These were chiefly from respondents who did not consider themselves eligible to vote, but a few were returned blank by those disapproving of the reorganization.

\* Attention was called to the provision of the proposed by-laws which stated: "Members of the Association not expressing a preference for any special division, shall be members of a Division of General Psychology." This definition of the division as a division-at-large affected the number of preferences expressed for it.





A general summary of divisional preferences is given in Table II. That the center of gravity of interest of psychologists has shifted toward

TABLE II  
SUMMARY OF PRIMARY AND OTHER CHOICES FOR DIVISIONS

Proposed Divisions	Primary Choices (double-checked)			Secondary Choices (single- checked)	Total Choices	Per cent of 3680
	Single Choice	One of Multiple Choice	Total			
1. Abnormal	112	54	166	1,314	1,480	40
2. Animal	35	6	41	304	345	9
3. Business	22	23	45	529	574	16
4. Child	227	84	311	1,308	1,619	44
5. Clinical	618	150	768	1,183	1,951	53
6. Consulting	152	94	246	1,166	1,412	38
7. Educational	210	73	283	1,029	1,312	36
8. General	212	33	245	632	877	24
9. Industrial	136	56	192	771	963	26
10. Measurement	104	48	152	959	1,111	30
11. Military	36	32	68	825	893	24
12. Personnel	316	101	417	1,316	1,733	47
13. Physiological	125	20	145	393	538	15
14. Public Service	17	11	28	297	325	9
15. Social	104	55	159	888	1,047	28
16. Teaching	71	41	112	791	903	25
17. Theoretical	73	23	96	497	593	16
18. SPSSI	61	40	101	784	885	24
19. Psychometric Soc.	46	24	70	590	660	18
20. Other (specified)	114	38	152	243	395	11
Total choices by 3,680 respondents	2,791	1,006	3,797	15,819	19,616	

applied fields is evident in the three choices which lead both in expressed primary preferences and in secondary preferences: clinical, personnel, and child. Apart from general psychology, which has a somewhat ambiguous meaning in this context, the several divisions next in order of primary preference are educational, consulting, and industrial. Physiological psychology follows these. That psychologists do not think of themselves as animal psychologists or as comparative psychologists in any considerable numbers is shown by the rating of animal psychology as 17th among the 19 named divisions in primary choices, and 18th in secondary choices.

When a stated list such as this one is presented for vote, unnamed divisions are at a distinct disadvantage, even though encouragement is given for writing in the names of additional divisions. Relatively few of those replying (about 10%) took advantage of the opportunity for writing in other divisions, and only 114 of 3,680 (3%) double-checked the written-in division as their one primary choice. That several divi-



sions even under these circumstances received an appreciable number of votes means that they would have received a much larger number had they been written on the ballot. The most frequently mentioned additional divisions are listed in Table III. The replies have been coded

TABLE III  
PREFERENCES EXPRESSED FOR DIVISIONS NOT NAMED ON THE BALLOT

Divisions Written-In	Primary Choices (double-checked)			Secondary Choices (single- checked)	Total Choices
	Single Choice	One of Multiple Choice	Total		
Experimental	30	5	35	31	66
Personality	15	4	19	15	34
Learning	9	0	9	11	20
Vocational Guidance	9	5	14	15	29
Esthetics	8	4	12	18	30
Medical	6	1	7	9	16
School	5	0	5	0	5
Religious	4	2	6	14	20
Genetic	4	1	5	17	22
Crime; Delinquency	3	1	4	11	15
Mental Hygiene	3	2	5	15	20
Others	18*	13	31	87	118
Total Choices	114	38	152	243	395

\* Not more than 2 preferences for any one additional division.

so that slight verbal differences were ignored in grouping the votes. Perception and psychophysics were included under experimental psychology; psychoanalysis was included under medical psychology. Esthetics includes all mentions of art, music, and literature. Educational guidance was in some cases mentioned with vocational guidance, and they are not separately tabulated.

The main interests not provided for in the list of named divisions as derived from the additional suggestions are those of general experimental psychology, personality in its general rather than clinical meaning, and esthetics. The other special interests are distinctive, but are in all cases closely related to proposed divisions.

In any attempt to simplify the divisional structure through the combining of divisions, it is important to know the overlap among divisional preferences. Therefore the replies have been classified according to the division of primary preference, and all other choices tabulated. The results are given in Table IV, in terms of the absolute number of votes. The last column of this table gives the number of divisions mentioned per reply, for each of the primary choices.

The data of Table IV have been expressed as percentages in Table V.



TABLE IV  
ALL CHOICES CLASSIFIED ACCORDING TO DIVISION OF PRIMARY CHOICE; NUMBER OF VOTES

Proposed Divisions: Primary Choices	Total Returns Classified According to Primary Choice	Other Divisions Checked by Those with Stated Primary Choice																				Number of Divisions Mentioned per Reply
		1. Abnormal	2. Animal	3. Business	4. Child	5. Clinical	6. Consulting	7. Educational	8. General	9. Industrial	10. Measurement	11. Military	12. Personnel	13. Physiological	14. Public Service	15. Social	16. Teaching	17. Theoretical	18. SPSSI	19. Psychometric Soc.	20. Other	
1. Abnormal	112	13	11	47	88	48	16	23	18	15	15	35	30	7	41	33	25	27	16	13	5.6	
2. Animal	35	4	1	10	7	2	6	13	8	7	6	5	21	3	11	10	16	13	4	3	5.3	
3. Business	22	4	0	1	0	0	3	1	21	6	3	17	0	2	4	1	0	4	2	0	4.5	
4. Child	227	60	8	388	142	75	110	26	20	54	9	62	12	12	64	47	20	54	29	9	4.6	
5. Clinical	618	388	13	28		350	217	56	77	141	75	236	44	38	121	117	49	130	130	33	5.3	
6. Consulting	152	82	2	22	75	111	51	12	40	24	33	85	13	14	35	34	10	36	16	9	5.6	
7. Educational	210	42	2	12	126	68	38	40	18	89	25	92	6	12	43	77	13	34	23	4	4.7	
8. General	212	78	38	20	61	55	34	46	46	21	66	55	12	66	61	76	41	23	22	5.1		
9. Industrial	136	27	4	82	16	41	54	15	11	60	24	117	10	13	16	8	7	23	28	7	5.1	
10. Measurement	104	11	6	17	23	29	19	50	18	28	19	53	4	10	24	17	15	23	70	5	5.2	
11. Military	36	16	1	12	7	19	12	7	2	18	10	28	6	5	7	3	5	4	7	2	5.8	
12. Personnel	316	65	7	119	56	113	117	97	38	195	114	80	11	43	69	51	21	53	40	13	5.1	
13. Physiological	125	40	60	3	23	30	9	8	32	17	24	14	1	3	10	22	28	12	12	11	4.0	
14. Public Service	17	3	1	4	3	11	6	2	1	7	4	5	12	1	5	2	1	6	3	0	5.5	
15. Social	104	32	11	11	37	30	24	19	30	20	24	10	31	12	11	30	30	70	10	7	5.3	
16. Teaching	71	35	6	9	33	29	22	36	23	16	23	14	33	4	21	10	17	9	4	4	6.0	
17. Theoretical	73	34	21	7	21	25	9	13	29	6	12	5	9	15	1	28	20	7	14	5.1		
18. SPSSI	61	20	2	7	25	19	14	15	9	12	13	7	24	3	16	50	5	15	10	7	5.5	
19. Psychometric Soc.	46	4	0	6	6	7	7	16	8	13	40	6	18	1	2	4	4	2	4	4	4.3	
20. Others (specified)	114	36	24	7	33	48	25	18	34	13	19	12	28	24	4	28	27	36	26	8	10	5.0
Total, Single Primary Choices	2791	990	219	386	991	870	887	737	406	593	725	390	965	282	212	647	569	379	603	447	177	5.1
Multiple Primary Choices	365	193	34	87	201	238	196	180	107	117	142	86	222	56	57	154	137	61	113	81	60	6.1
No Primary Choice	524	185	57	79	200	225	177	185	152	117	140	81	230	75	39	142	126	80	108	86	44	4.8
Total Returns and Choices	3680	1368	310	552	1392	1333	1260	1102	665	827	1007	557	1417	413	398	943	832	520	824	614	281	5.3



## PSYCHOLOGISTS' PREFERENCES FOR APA DIVISIONS

Other Divisions Checked Expressed as a Per cent of Those With Stated Primary Choice																						
Proposed Divisions: Primary Choices	Total Returns Classified According to Primary Choice <sup>a</sup>		Other Divisions Checked Expressed as a Per cent of Those With Stated Primary Choice																			
	Number	Per cent	1. Abnormal	2. Animal	3. Business	4. Child	5. Clinical	6. Consulting	7. Educational	8. General	9. Industrial	10. Measurement	11. Military	12. Personnel	13. Physiological	14. Public Service	15. Social	16. Teaching	17. Theoretical	18. SPSSI	19. Psychometric Soc.	20. Other <sup>b</sup>
1. Abnormal	112	100																				
2. Animal	35	100	37	12	10	42	77	43	14	21	16	13	13	31	27	6	37	29	22	24	14	12
3. Business	22	100	18	0	3	29	20	41	17	37	23	20	17	14	77	0	31	29	46	37	11	9
4. Child	227	100	26	4	4	5	63	33	48	11	9	27	14	77	5	5	18	21	5	18	9	0
5. Clinical	618	100	63	2	5	63	57	35	35	9	12	23	12	38	7	6	20	19	8	21	21	5
6. Consulting	152	100	54	1	14	49	73	34	34	8	26	16	22	56	9	9	23	22	7	24	11	6
7. Educational	210	100	20	1	6	60	32	24	18	19	9	42	12	44	3	6	20	37	6	16	11	2
8. General	212	100	37	18	9	29	26	16	18	22	22	22	10	31	26	7	31	29	36	19	11	10
9. Industrial	136	100	20	3	60	12	30	40	11	8	17	27	18	86	7	10	12	6	5	17	21	5
10. Measurement	104	100	11	6	16	22	28	18	48	17	27	44	18	51	4	10	23	16	14	22	67	5
11. Military	36	100	44	3	33	19	53	33	19	6	50	28	25	78	17	14	19	8	14	11	19	6
12. Personnel	316	100	21	2	38	18	36	37	31	12	62	36	25	11	3	2	8	16	7	17	13	4
13. Physiological	125	100	32	48	2	18	24	7	6	26	14	19	17	11	6	18	22	10	22	35	18	0
14. Public Service	17	100	18	6	24	18	65	35	12	6	41	24	30	71	6	30	30	12	6	35	18	0
15. Social	104	100	31	11	11	36	29	23	18	29	19	23	10	30	12	11	29	29	29	67	10	7
16. Teaching	71	100	49	8	13	46	41	31	51	32	23	32	20	46	20	6	30	27	14	24	13	6
17. Theoretical	73	100	47	29	10	29	34	12	18	40	8	16	7	12	21	1	38	27	25	36	10	19
18. SPSSI	61	100	33	3	11	41	31	23	25	15	20	21	11	39	5	26	82	8	25	16	11	11
19. Psychometric Soc.	46	100	9	0	13	13	15	15	35	17	28	87	13	39	2	4	9	9	4	9	9	9
20. Others (specified)	114	100	31	21	6	29	42	22	16	30	11	17	11	25	21	4	25	24	32	23	7	9
Total, Single Primary Choices	2791	100	35	8	14	36	31	32	26	15	21	26	14	35	10	8	23	20	14	22	16	6
Multiple Primary Choices <sup>c</sup>	365	100	53	9	23	55	65	54	49	29	32	39	24	61	15	16	42	38	17	31	22	16
No Primary Choice <sup>d</sup>	524	100	35	11	15	38	43	34	35	29	22	27	15	44	14	7	27	24	15	21	16	8
Total Returns and Choices	3680	100	37	8	15	38	36	34	30	18	22	27	15	39	11	8	26	23	14	22	17	8
Chances in 100 that division will be checked by those whose single primary choice is another division			37	8	14	39	40	34	29	16	22	27	14	39	11	8	24	21	14	22	16	7

<sup>a</sup> The division of primary choice was double-checked on the ballot; other divisions chosen were single-checked, except as indicated.<sup>b</sup> Other divisions written on the ballot. All mentions counted.<sup>c</sup> If more than one division double-checked, all divisions checked (whether single or double) were entered in this row.<sup>d</sup> Single-checks only.



In this table the secondary choices are expressed as a per cent of those with a given primary choice. This mode of presentation makes possible an interpretation by inspection of those divisional choices which lead to secondary choices different from the population as a whole.

Tables IV and V show the wide spread of secondary choices for all primary choices, with an average of something over 5 divisions being checked per reply. Some clusters of interest are evident, such as abnormal-clinical-consulting, business-industrial-personnel, measurement-Psychometric Society, social-SPSSI. Some logically overlapping interests do not in fact overlap, such as animal and child psychology.

The manner in which Table V can be used may be illustrated by animal and child psychology. From the table, the following assertions are possible:

4% of those whose primary preference was child also checked animal, which is less than the

8% of all those whose primary preference was other than animal who checked animal

Similarly,

29% of those whose primary preference was animal also checked child, which is less than the

39% of all those whose primary preference was other than child who checked child.

These results mean that the overlap between child and animal is less, on the average, than the overlap between either of these divisions and other listed divisions. This is an empirical argument against their combination.

By making use of the absolute numbers found in Table IV, it is possible to test the interrelationships of several divisions at once. For example, of the 882 whose primary choices were abnormal, clinical, or consulting, 815 or 92% checked clinical, 582 or 66% checked abnormal, and 550 or 62% checked consulting. It is evident that a grouping of these together as clinical would recognize the largest number of the group with a common preference.

Tabulations by society membership have not been made for the whole sample, but the ballots have been preserved, and supplementary analyses are possible. It is expected that the ballots will prove useful to the Division Organization Committee in obtaining lists of those interested in divisions but not represented by existing organized groups.



# IMPROVEMENT IN ELEMENTARY PSYCHOLOGY AS RELATED TO INTELLIGENCE\*

H. B. CARLSON, R. P. FISCHER, AND P. T. YOUNG  
*University of Illinois*

This study of improvement in elementary psychology as it is related to intelligence is an outgrowth of an attempt to devise a fair test of proficiency in elementary psychology and to set a reasonable standard for passing the test. The need for such a test arose when the University of Illinois established the policy of giving proficiency examinations each semester, similar to the regular semester examinations, in courses normally open to freshmen and sophomores. These examinations are considered to give sufficient evidence of mastery of a subject when a student gets a grade of at least *C* on the examination; this grade is recorded as *pass*, and it enables the student to go ahead with more advanced courses.

Most of the students who apply for proficiency examinations wish to accelerate their educational process through independent self-study. Occasionally a student applies for a proficiency examination when he has already completed a course in educational psychology or an introductory psychology course in some institution not accredited for college work by the University of Illinois.

Students frequently seek advice regarding preparation for a proficiency examination. To answer these inquiries we have prepared a mimeographed sheet which contains this statement:

Proficiency examinations in psychology are not based upon any single text-book or group of books, but upon the established facts and principles of psychology which may be found in standard texts. If a student wishes to prepare for a proficiency examination through independent study, it is recommended that he make use of several standard textbooks rather than a single book. Following is a list of standard textbooks and books for supplementary reading:

Then follows a list of six standard textbooks of psychology (latest editions). These are the texts by: Boring, Langfeld, and Weld; Cole; Dashiell; Guilford; Ruch; Woodworth. Seven supplementary books, used in the elementary course in psychology at the University of Illinois, are also recommended.

Obviously, with this advice to students and with applicants for a proficiency examination having varying backgrounds of preparation, a proficiency examination should not be based upon a particular text-book or elementary course in psychology. Rather, the examination should be based upon "the established facts and principles of psy-

\* Professor Woodrow suggested the equations which we have used in this study and read the manuscript.



chology." We could, of course, require the study of a specific content as the prerequisite for taking a proficiency examination and, in the end, this may prove to be the best plan. But we assumed that there is a general body of fact and principle which can be designated *psychology* and that a proficiency examination must be a test of the degree of mastery of this body of fact and principle.

To secure simplicity and objectivity in scoring the proposed proficiency examination, a new-type examination with short-answer questions upon the main topics of elementary psychology was prepared.\*

The list of topics includes: definition and scientific method, development, motivation, conflict and adjustment, emotion, attention, reaction, perception, learning, problem solving, memory, intelligence and aptitude, personality, individual differences, and the bodily basis of behavior. While this list of topics is arbitrary, the examination was agreed upon by the persons writing it as giving a fair balance and emphasis to the subject matter of elementary psychology. When completed, the examination had a total of 302 points, the multiple choice questions carrying double weight and the true-false statements carrying single weight.

The examination was first used as a final examination in two divisions of the elementary course in January, 1943, a total of 288 students taking it. Following this, the examination was revised to eliminate ambiguous items and those based too specifically upon the textbook of the course.

The revised examination was used as a pre-test in psychology on the first two class hours of a course in elementary psychology commencing in the fall of 1943. The students were told that their scores would not affect their semester grades but they were urged, nonetheless, to do their best. They were told that this examination had been used as a final examination in the previous course and that we wished to compare their performance at the start with that of students at the close of the previous course. We stressed the value of the examination as an educational exercise which would acquaint them with the kind of examination to be used in the course, with the content of the course, and with the kind of information and skill we expected them to attain, etc. There were many observable indications that the students cooperated and were serious about the examination, and none to the contrary. There was no hint that the identical examination would be used as a final examination at the close of the course.

\* The examination was prepared and revised by members of the staff teaching elementary psychology at the University of Illinois in the divisions of Dr. P. T. Young, and include Drs. I. A. Berg, H. B. Carlson, J. W. Gebhard, M. J. Kientzle, F. McGehee, Mr. J. M. Rich, Miss D. Simrall, and Dr. S. M. Watson.



The examination, however, was used as a final examination at the close of the course without warning or comment, in order to obtain an index of the extent of improvement in knowledge of psychology. It is of interest to note that no student commented upon the similarity between the pre-test and the post-test. It may be that some students recognized the examination as that previously taken, or recognized some of the items, but simply did not comment upon the fact. On the other hand, with an entire semester of study intervening between pre-test and post-test, it is quite possible that the examination as a whole was not recognized, even though specific items were somewhat familiar.

During the course we administered the Otis test of mental ability (Gamma test: form Am) to illustrate intelligence testing. In this way, we obtained intelligence test scores to be correlated with scores made in the pre-test and post-test.

Although there were 201 students in the course, we have limited the present study to 118 who took the pre-test, the post-test, and the Otis. The discrepancy between the two figures is due mainly to an unprecedented withdrawal of students during the semester to enter the military services and other forms of war work. A few students who completed the course were absent from the pre-test and others were absent on the day the Otis test was given.

The error scores of these 118 students in the pre-test and in the post-test are given graphically in Figure 1. Also, as a matter of interest, we have added the error scores of the twenty individuals who took this test as a proficiency examination in psychology during the year between March 1, 1943 and March 1, 1944. These twenty individuals were undergraduate students at the University of Illinois who attempted to obtain credit in elementary psychology without attending the regular classes.

The median error score for the pre-test is 113. The median error score for the post-test is 58. There is thus a gain of 55 points between the medians of the pre-test and post-test representing improvement in elementary psychology as a consequence of instruction, increased familiarity with this type of examination, perhaps increased motivation, and possibly other factors.

The data presented above were analyzed by correlation techniques with the following results.

The error scores on the pre-test were correlated with the scores on the post-test by means of the Pearson product-moment method of correlation. The value of  $r$  thus obtained is .504. In general, then, students who did relatively well on the pre-test also tended to do relatively well on the post-test, while those who did poorly on the pre-test tended to do poorly on the post-test. The pre-test could be used, therefore, to



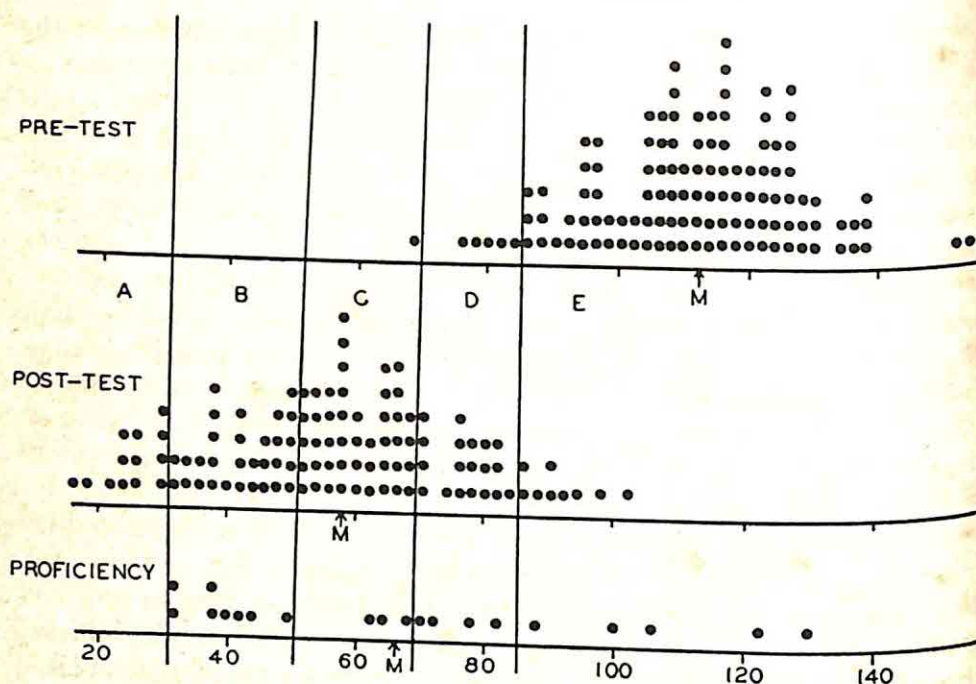


FIGURE I. DISTRIBUTION OF ERROR SCORES

The upper distribution presents error scores of 118 students who took the examination as a pre-test in psychology; the median score (M) is 113. The central distribution gives the error scores for the same students at the close of the course; the median (M) is 58. The lower distribution shows the scores of twenty students who took the test as a proficiency examination in psychology during the year between March 1, 1943 and March 1, 1944; the median (M) for this group is 68. Error scores for the three distributions are shown along the base line of the figure. Vertical cross lines indicate the divisional points for the letter grades (A, B, C, D, E) on the post-test.

predict aptitude for elementary psychology about as well as most scholastic aptitude tests predict college grades.

It is possible to check this conclusion by correlating the scores made on the Otis test with the scores on the pre-test and the post-test. Since the scores on the pre-test and the post-test were error scores, the sign of the coefficient of correlation of these with scores on an intelligence test must be inverted to be consistent with the usual practice of letting high scores indicate good performance. The correlation coefficient between the pre-test and the Otis test is .556, while that between the post-test and the Otis test is .429. These correlations give evidence favorable to the conclusion just made.

While the scores on both pre-test and post-test correlate positively with scores on the Otis, the magnitude of the correlation is greater in the case of the pre-test than in the case of the post-test. It would thus appear that intelligence is more involved as a determiner of scores in the pre-test than it is in the post-test.



Woodrow (2) has shown that the effect of practice upon a test which correlates positively with intelligence is generally to *lower* the degree of relationship as indicated by the correlation coefficient. Our finding is in line with Woodrow's conclusion in so far as the learning which occurs in a college course of the sort here considered is analogous to the learning which occurs with practice under laboratory conditions. In the present instance other factors than practice are involved. Some of these may be differences in motivation, in efficiency of study habits, in opportunity to study as dependent upon health, financial status, environmental factors not under control of the student, as well as personality problems and emotional strain while under pressure of the post-test which was the final examination for these students.

It is possible to demonstrate that intelligence is not correlated with gains in achievement in psychology. One way to do this is to correlate the scores on the Otis test with difference scores between pre-test and post-test. These difference scores give objective evidence of improvement in psychology, but not unambiguously so. This measure of improvement is open to the objection that a gain of  $n$  points is relatively more difficult to achieve at the low error end of the distribution than at the high error end of the distribution, *i.e.*, a change of 10 points from 10 errors to 0 errors is probably much more difficult to achieve than is a shift from 150 errors to 140 errors. Further, since there is a ceiling of zero errors, a score of 10 errors on the pre-test can improve a maximum of 10 points whereas a score of 150 errors on the pre-test has the possibility of improving a total of 150 points. However, in the absence of any other objective evidence of improvement in achievement in psychology we decided to use difference scores.

Instead of calculating the difference scores as indicated, it is possible to determine the correlation between gains and the intelligence scores more simply by means of an equation suggested by Woodrow. This equation is:

$$r_{I_0} = \frac{\sigma_{P_2}r_{IP_2} - \sigma_{P_1}r_{IP_1}}{\sqrt{\sigma_{P_1}^2 + \sigma_{P_2}^2 - 2r_{P_1P_2}\sigma_{P_1}\sigma_{P_2}}}$$

in which,

- $r_{I_0}$  = correlation of intelligence with gains
- $r_{IP_1}$  = correlation of intelligence with pre-test
- $r_{IP_2}$  = correlation of intelligence with post-test
- $r_{P_1P_2}$  = correlation of pre-test with post-test
- $\sigma_{P_1}$  = standard deviation of pre-test
- $\sigma_{P_2}$  = standard deviation of post-test

The correlation thus obtained is  $-.039$ , which very definitely indicates the lack of any significant correlation between gain scores and Otis scores. Surprising as this result may seem, it is consistent with the finding of other investigators.



Drake (1), for example, found a correlation of  $-.14$  between scores on the A. C. E. scholastic aptitude test and gain in knowledge of biology as measured by two forms of the Coöperative Test Service Biology Test, with 217 students. His measure of gain was the difference between initial and final standard scores. He believed that the explanation of his results necessitated the postulation of a growth factor not related to intelligence which he called the "Iota Function."

Do students who come to the course best prepared (as measured by their scores on the pre-test) gain more through practice and tuition in the materials covered by the test (as measured by the difference between post-test and pre-test scores) than those who come less well prepared? The answer to this question can be found by correlating the gain scores with the pre-test scores.

In studying the problem we made use of an equation suggested by Woodrow, as follows:

$$r_{P1g} = \frac{\sigma_{P2}r_{P1P2} - \sigma_{P1}}{\sqrt{\sigma_{P1}^2 + \sigma_{P2}^2 - 2r_{P1P2}\sigma_{P1}\sigma_{P2}}}$$

in which,

- $r_{P1g}$  = correlation of pre-test with gain
- $r_{P1P2}$  = correlation of pre-test with post-test
- $\sigma_{P1}$  = standard deviation of pre-test
- $\sigma_{P2}$  = standard deviation of post-test.

The correlation thus obtained is  $-.359$ . This coefficient of correlation is exaggerated because chance errors in the pre-test scores are negatively correlated with the same chance errors in the gain scores. To eliminate this spurious effect it is necessary to correct for unreliability each statistical element in the equation. This can be done by substituting the coefficient of correlation between pre-test and post-test after its correction for attenuation, and the true standard deviations for both pre-test and post-test. The corrected coefficient of correlation between pre-test and gain is  $-.010$ . This shows that there is no relation between initial knowledge of the content of the introductory course in psychology as measured by this proficiency examination and the gains made by the students.

The correlation between post-test and gain may be obtained by the following equation:

$$r_{P2g} = \frac{\sigma_{P2} - \sigma_{P1}r_{P1P2}}{\sqrt{\sigma_{P1}^2 + \sigma_{P2}^2 - 2r_{P1P2}\sigma_{P1}\sigma_{P2}}}$$

in which,

- $r_{P2g}$  = correlation of post-test with gain
- $r_{P1P2}$  = correlation of pre-test with post-test
- $\sigma_{P1}$  = standard deviation of pre-test
- $\sigma_{P2}$  = standard deviation of post-test.



This coefficient of correlation is .625. However, since this coefficient of correlation is influenced by chance errors in the post-test which are positively correlated with the same errors in the gain scores, the value must be corrected in the same manner as that used above in correcting the correlation between pre-test and gain scores. The corrected coefficient is .712, which indicates that those students who gained most from the course also had the highest post-test scores and that those who gained least had the lowest post-test scores.

Since we have shown that gain scores (post-test minus pre-test) for our group of students do not correlate with intelligence nor with initial knowledge of elementary psychology, other factors than intelligence and prior knowledge must account for the improvement in achievement. We do not have specific evidence to indicate what these factors are, but we would expect that among the more important ones are interest and motivation, opportunity to study, effective study habits, traits of personality, and emotional conflicts both at the time of study and at the time of taking the examination. At any rate, it is apparent that non-intellectual factors must be assumed to account for differential improvement in achievement in the introductory course in psychology so far as that improvement is measured by our test.

In summary, the examination which we prepared to measure proficiency in elementary psychology is to some extent a measure of intelligence. When the proficiency examination in psychology is taken prior to formal study of psychology the correlation coefficient of the scores on this test with the scores on the Otis Gamma test of intelligence is .556. However, when the same psychology examination is taken after formal training, the correlation with the same test of intelligence drops to .429. The correlation between gain in score on the same test following practice and tuition in the material covered by the test with scores on the Otis test is found to be  $-.039$ . This coefficient indicates clearly the lack of any significant correlation between gain in score and intelligence. The correlation between gain in score and the pre-test is  $-.010$ , indicating that the pre-test cannot be used to predict the amount of gain a student might be expected to achieve in the course. The correlation between gain in score and post-test is .712, indicating that the post-test scores are closely related to gain in achievement.

There are several possible interpretations of these results. One of these is that the proficiency test which we used was largely a memory test and, therefore, did not measure increased understanding of principles. Another possible interpretation is that perhaps the ceiling or task limit of the test was too low to permit students with good scores on the pre-test to show their progress to the fullest degree. A further interpretation is that improvement following tuition is largely dependent



upon non-intellectual factors. Among the more important of these we would expect to find interest and motivation, opportunity to study, study habits, personality traits, and emotional conflicts at the time of study and at the time of taking the examination. These factors call attention to the importance of non-intellectual processes in accounting for differential improvement in achievement.

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# PSYCHOLOGY IN THE TRAINING OF OCCUPATIONAL THERAPISTS

FRANCES McGEHEE  
*University of Illinois*

Professional training in occupational therapy approved by the American Medical Association is now being offered in fourteen colleges and universities in the United States and Canada. Recently nine additional colleges and universities have organized courses designed to meet the requirements set forth by the Council on Medical Education and Hospitals of the American Medical Association which regulates the standards by which schools are accredited. Graduation from an accredited course leads to eligibility for the Directory of Registered Occupational Therapists maintained by the American Occupational Therapy Association. To meet the demands for occupational therapists in army, navy, and civilian hospitals, many colleges and universities have provided instruction and clinical training to enable students to fulfill the educational requirements of a registered therapist.

In August of 1943 the University of Illinois established a nine-semester curriculum leading to a Bachelor of Science degree in occupational therapy in the College of Medicine. Theoretical training is offered in the biological and social sciences, clinical subjects, and theory of occupational therapy. Technical training is offered in the therapeutic arts and crafts, educational and recreational therapy. Clinical training includes practice in general, orthopedic, tuberculosis, mental, and children's hospitals.

Fifteen hours of biological science required by the American Medical Association includes at least two courses in psychology, one of which is the general introductory course. The second course in psychology for students in the occupational therapy curriculum at the University of Illinois, is the topic of this paper. There were two purposes in designing the course: (1) the application of the principles of psychology to the theory and practice of occupational therapy and (2) the preparation of students for lectures in psychiatry at the Medical School in Chicago. Psychology Applied to Occupational Therapy is the course which developed in an attempt to bridge the gap between introductory psychology and psychiatry in the professional training of occupational therapists. The content of the course as offered at the University of Illinois in the fall of 1943 is presented in the outline shown on the next page.

Individual differences in intelligence, motivation and adjustment are emphasized throughout the course to enable the student in occupational therapy to understand and appreciate the problems in self-



## PSYCHOLOGY APPLIED TO OCCUPATIONAL THERAPY

(Psychology 36)

*I. Analysis of Behavior*

- Stimulus and response
- Emotion
- Intelligence
- Learning
- Motivation
- Adjustment

*II. Methods of Appraising Personality*

- Psychological tests
- Rating scales
- Case history
- Interview
- Observation on life situations
- Questionnaire
- Play techniques with children
- Projective and apperceptive tests

*III. Understanding the Abnormal Personality*

- General criteria of abnormal personality
- Psychopathological symptoms
- Pathogenic and psychogenic factors
- Case material
  - The normal individual
  - The mentally deficient
  - The psychotic
  - The neurotic
  - The psychopathic personality

*IV. Psychology of the Physically Handicapped*

- The crippled
- The blind
- The hard of hearing
- Speech defectives

*V. Mental Hygiene*

- For the occupational therapist
- For the hospitalized and convalescent patient.

adjustment, educational, social, and vocational adjustment with which the physically and mentally handicapped individual is confronted. By understanding the patient as an individual, discovering his interests, appraising his abilities, encouraging him to face problems and to solve them by employing the scientific method, and finally by motivating the individual through muscle reeducation to develop skills in constructive activities, the occupational therapist aids the patient in his physical and mental recovery and thereby effects a personality readjustment, releasing the rehabilitated individual for usefulness in some worthwhile field of endeavor.



# PSYCHOLOGY AND THE WAR

Edited by  
DONALD G. MARQUIS

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## PSYCHOLOGICAL ACTIVITIES IN THE TRAINING COMMAND, ARMY AIR FORCES

STAFF, PSYCHOLOGICAL SECTION  
*Office of the Surgeon, Headquarters, Army Air Forces Training Command  
Fort Worth, Texas\**

This article is the seventh in a series describing the Aviation Psychology Program of the Army Air Forces. In previous articles (2, 3, 4, 5, 6), the activities of the individual units have been described. The first article of the series (1) described the organization and general functions of the Program up to July 1943. The present report treats the development of the Aviation Psychology Program in the AAF Training Command subsequent to the period covered by the first article, and is to a large extent a report of the activities of the Psychological Section, Medical Division, Headquarters, AAF Training Command. This office has been the operating agency for the psychological testing and classification of aircrew trainees since the summer of 1942, and has been responsible for the supervision of psychological research in the AAF Training Command since shortly before the close of 1943. The Aviation Psychology Program which is under the general supervision of the Psychological Branch, Research Division, Office of the Air Surgeon, now has units in the AAF Personnel Distribution Command, in the Continental Air Forces and in some overseas Air Forces. These other activities will be referred to only incidentally in the present article.

\* This article was prepared by the Staff of the Psychological Section and edited in the Psychological Branch, Research Division, Office of the Air Surgeon, Headquarters, Army Air Forces, Washington, D. C.

## I. MISSION

The Psychological Section, Medical Division, Army Air Forces Training Command was established on 21 April 1942 and was assigned primary responsibility for the "application and correlation of the various tests used in the classification of aircrew members." In addition to directing routine testing activities throughout the Training Command, this implied also the collection of test results and training criteria and the performance of various statistical analyses in the determination of the validities of the individual tests and of the classification test battery as a whole. Subsequently, the mission of this Section was expanded to include the supervision and coordination of psychological research activities, including test development, the preparation of recommendations to Headquarters, Army Air Forces for changes in the nature of the classification test battery, and the publication and distribution of technical and non-technical reports of psychological research and classification testing.

## II. ORGANIZATION AND PERSONNEL

In order to achieve a certain degree of specialization of responsibility and function, this Section was subdivided into four units: Administrative, Statistical, Field Studies, and Research. The Administrative Unit is responsible for determination of policy, matters of budget and supply, personnel management and records, and the integration of the activities of the other units. The Statistical Unit is responsible for the flow and maintenance of records, and the performance of the various statistical analyses demanded by the routine testing and research activities of the program. The Field Studies Unit was entrusted with the task of securing and studying criterion data, performing job analyses, and maintaining liaison with various training agencies in the field. The Research Unit's functions and achievements have been reported in a previous article (6).

As indicated in the original article of this series (1) applicants for Aviation Cadet training who passed the Aviation Cadet Qualifying Examination before the end of October 1943 entered a period of basic military training which was followed by five months of instruction in a college or university. Applicants were then sent to a classification center where they were given the psychological classification tests and were assigned to a specific type of training depending upon the aptitude scores which they obtained, the preferences which they stated and the quota requirements of the Army Air Forces. This system had some obvious defects, notably that of retaining throughout a lengthy period men who would eventually be disqualified on the basis of their test performance.

When, on 7 July 1943, the Army Air Forces Training Command was activated as a combination of the Army Air Forces Flying Training Command and the Army Air Forces Technical Training Command, and all agencies concerned came within a single jurisdiction, it was decided to perform the psychological



classification testing at Basic Training Centers before the applicant was admitted to the college course. Since a large number of applicants who were already in college had to be tested upon termination of their college course, while at the same time new trainees were to be tested prior to their college training, an immediate expansion of the testing program became necessary.

In order to accomplish this expansion, Medical & Psychological Examining Units were set up at seven Army Air Force Basic Training Centers. These units were responsible for precollege testing while the Psychological Research Units continued to test those men who had completed their college course. The expansion necessitated the testing of approximately four times as many men per unit time and raised a number of problems with respect to psychological personnel procurement and training and maintenance of standardized classification procedures.

To cope with these problems, a new unit, the Test Operations Unit, was added to the organization of the Training Command Headquarters Psychological Section and entrusted with the planning of all aptitude testing activities and psychological processing in the field units. At the same time the Field Studies Unit, whose mission was believed to have been substantially accomplished, was disbanded and a Field Research Unit was formed which had the major function of coordinating psychological research activities. The need for such coordination had become more and more pressing as personnel were dispersed into many field units and as the areas of study became more varied. The former Research Unit was moved at this time to Santa Ana Army Air Base, Santa Ana, California, became specialized in its function, and was designated the Psychological Test Film Unit (6).

By 1 November 1943 the Psychological Section, Headquarters Army Air Forces Training Command consisted of an Administrative Unit composed of Lt. Colonel (now Colonel) F. A. Geldard, Major (now Lt. Colonel) A. P. Horst, Colonel (now Major) B. F. Krafft, Jr.; a Field Research Unit composed of Lt. Colonel J. P. Guilford, Captain (now Major) R. L. Thorndike, Captain (now Major) R. T. Sollenberger, Captain (now Major) E. H. Kemp, Captain (now Major) S. R. Wallace, Jr., and Captain L. F. Carter; a Test Operations Unit composed of Major E. E. Ghiselli and 1st Lt. (now Captain) B. von H. Gilmer; a Statistical Analysis and Records Unit composed of Major W. L. Deemer, 1st Lt. (now Captain) L. Berwick, 1st Lt. (now Captain) G. B. Simon, and Mr. A. G. Whitney.

### III. SUPERVISION OF CLASSIFICATION TESTING AND PROCESSING

The major function of this Section has been and continues to be the supervision of psychological classification testing and of the preparation of recommendations for aircrew training assignment based upon psychological procedures. A description of the general procedures employed may be found in the first article of this series (1). However, it may be of interest to indicate some of the changes which were made in these procedures and some of the problems which attended those changes.

The necessity for the activation of the seven Medical & Psychological Examining Units has been discussed above. The magnitude of this change may best be appreciated in terms of a comparison between the number of men



tested before and after the establishment of these units. For example, slightly more than 4,000 trainees were tested nationally per week in October 1943, and this may be regarded as a representative rate for the preceding year. In the week ending 18 December 1943, however, less than two months after the establishment of the Medical & Psychological Examining Units, approximately 15,000 trainees were tested. In the period between 1 July 1943 and 30 June 1944, approximately 338,000 men were completely tested with the psychological classification battery. In order to accomplish testing in such large numbers, it was of course necessary to obtain the services of many individuals with psychological training. This problem of personnel procurement, never an easy one, became particularly acute when the Medical & Psychological Examining Units were established and the flow of men to be tested increased. A basic nucleus for each of the Medical & Psychological Examining Units was provided by transfer of experienced officers and enlisted men from the three Psychological Research Units. These cadres were supplemented with men who had previously served as enlisted men at Psychological Research Units and subsequently graduated from Officer Candidate Schools, and with officers with psychological training who had been assigned to other duties within the Training Command. Some 200 enlisted men were obtained from the Army Specialized Training Program in which they had received training in psychological testing. These were supplemented by other enlisted men without psychological training who were believed capable of learning to carry out satisfactorily the more routine testing duties.

As the usefulness of the Classification Test Battery for the prediction of graduation or elimination from flying training became apparent and as changes in procurement policies increased the number of aircrew applicants, minimum qualifying aptitude scores have been raised by the action of Headquarters, Army Air Forces. At the present time, in order to qualify for pilot training, an applicant must obtain a pilot aptitude score of 6. The minimum qualifying bombardier aptitude score is also 6, while qualification for navigator training depends on a navigator aptitude score of 7.\* The determination of these qualifying scores is a complex matter which involves many considerations. Not the least of these springs from the fact that the qualifying scores must be so balanced as to qualify a sufficient number of trainees for each air-crew specialty. The general trend of changes in minimum qualifying scores has been one of progressively cutting off more and more individuals, until only about half of the applicants who are tested now qualify for one or more of the Aircrew Officer specialties.

\* The method of obtaining these aptitude scores is described in the first article of this series (1). The scores are expressed on a nine-point scale based on half standard deviation units for a normally distributed group. A pilot aptitude score of 6 therefore extends from one-quarter to three-quarter standard deviations above the mean in a normalized distribution of scores of all men who take the tests, having previously passed the Army Air Forces Qualifying Examination. It is of interest to note that the term "stanine" has been coined for these scores and has found wide acceptance. It seems highly probable that the term is destined to become good psychological jargon, as it has already attained widespread military usage.



## IV. BASIC DATA

The data upon which the Training Command Psychological Program has been largely based in both its operational and research functions are obtained from the field units and the training schools. The maintenance of these records is the responsibility of the Statistical Unit. This Unit has faced and solved a number of knotty problems resulting largely from the magnitude of the testing program and the new methods involved in preparing data for use with IBM machines. Data on all men tested with the classification battery are reported by the field units on cards and rosters.

A name card for each man tested gives the individual's name, date and place of testing, testing number, army serial number, age, marital status, education, and previous flying experience. Other non-test data, reported by roster, are: medical qualification, military and training status, strength of interest for each type of training, first preference for type of training, and preference waiver (the individual is given an opportunity to indicate his degree of willingness to be classified for the form of training for which his aptitude score is highest regardless of his preference). Test and classification data, also reported by roster, include scores on each of the tests in the battery, aptitude scores for each aircrew specialty, the classification recommended by the Psychological Unit, and the actual assignment made by the Assignment Board. The data received from the training schools are in rosters which give the name, army serial number, and disposition (graduation, elimination and cause, holdover and cause, etc.) of each man in training.

The processing of the records, maintenance of the files, and the analysis of these data are performed primarily on IBM machines. The data are entered on punch cards which are filed in various ways in order to expedite collation and to facilitate the many searches which must be made in connection with special studies. At the present time, the Statistical Unit maintains ten such files arranged variously by army serial number before graduation, by officer serial number, by testing number, by class, and alphabetically, by name. Besides accumulating and collating the psychological data and training information, the Statistical Unit disseminates these data in the form of rosters and punched cards to the field units and psychological detachments outside the Training Command.

An indication of the magnitude and extent of the records now being maintained may be obtained from the following facts. Over one-half million individuals are represented. Approximately six million punch cards are at present in active files, and an additional two million are in temporary and inactive files.

In the course of the basic record keeping and research with these records on IBM cards a number of unusual applications of IBM machines have been employed and several new techniques have been developed. Without going into technical detail, it may be of interest to



note some of the applications of IBM machines to the problems of the Psychological Program.

1. *Procedure for Alphabetic Collating.* Normally the collator will not merge alphabetically. By coding the alphabetic zone punches, the collator can be made to recognize alphabetic punching and thus merge alphabetically. In this way, newly alphabetized cards can be economically merged in the previously alphabetized cards to keep a current alphabetic file.

2. *Procedure for Obtaining Frequency Distributions on the Tabulator in Intervals of Between 1 and 10.* Ordinarily by controlling on the tens position a distribution in intervals of ten is obtained and by controlling on the units position a distribution in intervals of one is obtained. With the aid of specially prepared interval heading cards—distributions in intervals of any number between 1 and 10 may be obtained.

3. *Procedure for Converting Three Strengths of Interests to First Preference on the Collator.* The problem of converting the expressed strength of an interest on a 1 to 9 scale for Bombardier, Navigator, and for Pilot training to a 1st preference: i.e., picking the highest rating, including all combinations of ties, had to be solved. Although ordinarily the collator compares only two things and decides whether they are equal or one is higher or lower, a method has been developed for making this 3-way comparison, picking the highest of the three and ties.

4. *Correlation Methods.* Several different methods for obtaining the basic data ( $\Sigma X$ ,  $\Sigma Y$ ,  $\Sigma XY$ ,  $\Sigma X^2$ ,  $\Sigma Y^2$ ) necessary for computing correlation coefficients are used. The typical correlation problem encountered is one involving some 30 2-digit variables for about 5,000 cases. The most useful method is one involving digitizing and progressive totals with the cutting and tabulating of summary cards. Elaborate check techniques are used. When this method is applied to 2-digit and 3-digit variables, it is possible to select and position information so that the tabulation of summary cards will yield a single total for the sums of squares and cross products.

5. *Biserial Distributions and Sums of Squares.* Using digitizing, class selection, progressive totals, and total transfer, pass-fail distributions are obtained yielding the sums of squares for the total group at the same time as the distributions are obtained.

6. *Headings and Board Checks.* Special Headings Cards are used to identify completely each run and each group of cards (i.e., each population or sample). Complete board checks are mandatory. The board check is an elaborate run designed to give printed proof of everything the machine is supposed to be doing.

## V. DEVELOPMENT AND VALIDATION OF DEVICES FOR PREDICTING AIRCREW SUCCESS

The general procedures followed in the development, application, and validation of the Classification Test Battery have been outlined in the initial article of this series. Job analyses, test construction, and validation of tests in the Classification Test Battery and of experimental tests which are candidates for inclusion in the battery have continued. One point which has been forcibly brought home to members of the program is that validation analyses must be routinely performed on all



tests employed. Validity estimates even when obtained on very large samples, have fluctuated to a substantial degree. However, by cumulating data from many large samples and by using a large number of tests in the Classification Battery it has been possible to obtain a gradual, consistent improvement in the validity of the composite aptitude scores in successive revisions of the battery.

The battery employed throughout the greater part of the current year includes 18 tests, of which 12 are of the paper and pencil variety and 6 are individual apparatus tests. Some of these tests are chiefly of value in the prediction of one particular specialty, others are weighted for two, three, or in some cases for all of the various aircrew specialties. It is of interest to note that the best weighting of the 12 printed tests for predicting success in primary pilot training schools gives an estimated multiple validity coefficient equal to the best weighting of the 6 psychomotor tests (.51). The best weighting of all tests combined gives a multiple validity coefficient of .60. These figures are based on validity coefficients and intercorrelations obtained from several thousand cases. The data appear to justify the increased expenditure entailed by the use of apparatus tests.

From the outset it has been recognized that the only valid basis for any system of selection and classification of personnel for the various aircrew specialties is proficiency in combat. However, at the time the research program was started this country was not at war. Furthermore, it was believed that as a tentative criterion of the suitability of individuals selected, the judgments of instructors and AAF officers serving as check pilots and supervisors would provide the most useful and valid evaluations of the men selected which could be obtained within a reasonable period following their selection and classification.

In a preliminary study made during the summer and fall of 1941 it was determined that the most carefully made decision about a student in flying training schools is whether to send him on to the next stage and eventually to combat or to eliminate him from further consideration and training in that specialty. This decision is usually based on the separate judgments of several persons who have flown with the individual to check the original estimate of the instructor. In instances where it is believed another instructor might regard the student as promising, he is given another opportunity for training with a new instructor. Although it is recognized that variation in standards not only of individual instructors and check pilots but also of schools and classes, will attenuate the validity coefficients obtained, the general comparability of the values obtained from samples with quite different proportions of graduates and eliminees is insured by using biserial correlation coefficients.

Before a test is included in the Classification Battery, therefore, it is validated upon a number of samples. When possible, it is validated against the graduation-elimination criterion in elementary, basic, and



advanced pilot training and in specialized navigator and bombardier training. However, a test may be considered for inclusion in the composite pilot aptitude score upon the basis of its validity for elementary pilot training alone since by far the largest proportion of elimination occurs during that phase. This procedure is also justified on the basis of data which demonstrate that the validity of a test for elementary training does not differ very greatly from its validity for elementary, basic, and advanced training combined. Validation of experimental tests for bombardier or navigator training presents a more difficult problem because only a small proportion of aircrew applicants enter such training, and a very large group of unclassified applicants must be tested in order to provide an acceptable sample. This problem has been met by giving, at a later stage, experimental test batteries composed of tests specifically designed for these forms of training to applicants who have already been classified for them.

Periodically, data obtained from the validation of experimental tests and from the routine validation of the Classification Battery are evaluated, and indicated adjustments in the composition and weighting of the battery are made. The multiple regression technique is used in determining the weight of each test for each of the three psychological aptitude scores. The estimates of test validities obtained from validation studies are employed. These are occasionally regressed, however, when in the judgment of the Aviation Psychologists they can be improved by utilizing additional information. For example, when an experimental test, on the basis of a few samples, shows unusually high validity, a somewhat lower validity estimate is assigned to it in order to take account of the expected shrinkage in subsequent samples and to avoid placing too much confidence in the stability of a single test. Occasionally, too, when a test is believed to be very promising on the basis of observation, reports, and analyses of combat requirements, and insufficient data are available for an estimate of validity, the test is weighted by judgment and included in the battery. A new weighting is then made when validity data mature.

The determination of test weights has been accomplished separately for each aircrew specialty. That is, a set of weights for pilot has been determined by combining tests in such a way as to give the maximum prediction of the pilot criterion, a second set has been prepared in the same way for navigator, and a third set for bombardier. The three resulting composite aptitude scores have shown substantial positive intercorrelations—usually between .50 and .70 but in certain batteries as low as .20 and as high as .90. Since minimum qualifying scores have been set so as to disqualify a large number of individuals from each of the three aircrew specialties, and a substantial number from all three,



it is apparent that the test results have served in part a selection function. Classification—the determination of the one of several categories to which each man can most profitably be assigned—has been achieved somewhat indirectly by this multiple cut-off procedure. In addition, the psychological processing units have considered the stanine scores, preferences and strengths of preferences for each individual for a specific type of training.

The statistic employed as the estimate of validity of each test has been the biserial coefficient of correlation. In the use of this coefficient there have arisen some problems of which the most difficult is concerned with the application of corrections for the restriction of range. Since the group which enters aircrew training is first screened on the basis of the Aviation Cadet Qualifying Examination (now designated as the AAF Qualifying Examination) there is little doubt that the range of scores on each of the tests is restricted to varying degrees. Further restriction occurs as a result of the use of minimum qualifying aptitude scores (stanines). Correction for the restriction resulting from the Qualifying Examination has, thus far, not been made. Formulas for the correction of the second type of restriction have been employed, although it is not believed that this problem has been solved to a completely satisfactory degree because it appears that not all of the assumptions on which the known formulas are based are valid. More information in this regard should be available as data mature for an experimental group of approximately 1,500 candidates admitted to pilot training without regard to scores on the Qualifying Examination or the classification tests.

In any case, it has been recognized that the usefulness of the biserial coefficient is primarily that of a tool for the statistical manipulation of data rather than a true statement of the contribution of the test battery to effective selection and classification. Furthermore, military authorities are not inclined to interest in esoteric statistical devices. The basic data employed in evaluating the effectiveness of the test battery and in coordinating the results of psychological testing with the establishment of minimum qualifying scores are, therefore, presented in the form of tables of elimination rates by stanine. Thus, an examination of Figure I will show that, while less than 5% of the group receiving the highest pilot aptitude score were eliminated from elementary training, almost 80% of those receiving the lowest score were eliminated. The individuals with very low stanines were established. If in the war, before minimum stanine requirements were established, the current minimum qualifying score of 6 for pilot training had been in force for the entire group shown in Figure I and the same elimination-graduation policy had been maintained, 70% of the potential eliminees



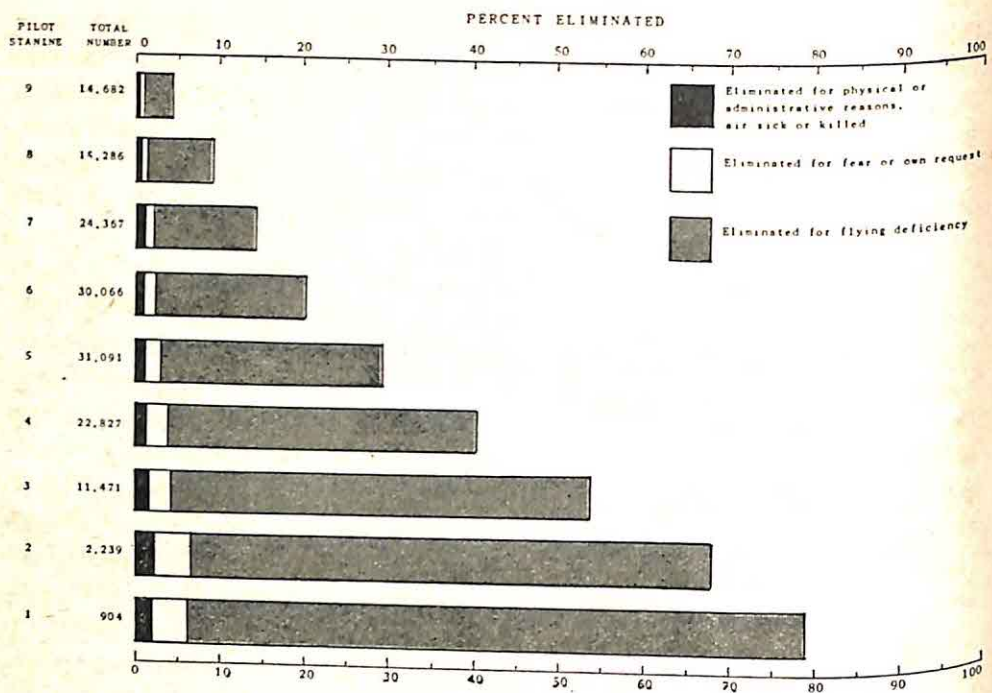


FIGURE I. PER CENT ELIMINATED FROM PRIMARY PILOT TRAINING.

This includes those eliminated for flying deficiency, fear or own request, and physical or administrative reasons for each pilot stanine in fifteen consecutive pilot classes totaling 153,000 cases. The overall elimination rate is 25%.

would have been disqualified but only 37% of the potential graduates. Actually, of course, these data suffer from the effect of range restriction since many of those obtaining scores of 1, 2, and 3 were disqualified from training. Any statement of the type made above is, therefore, very definitely on the conservative side. Similar data are shown for bombardier and navigator training in Figures II and III. It should be noted that men with navigator stanines of less than five were not permitted to enter navigator training in these classes.

While graduation-elimination from training has been the commonly used criterion employed in the preparation of test weights, other criteria have not been allowed to go unexplored. Interest in these criteria has arisen not only from the desire for improved test validation but also in the hope of obtaining improved standards of proficiency in aircrew tasks which would be more closely related to combat performance, which would provide more sensitive measures to be employed in evaluating training methods, and which, perhaps, might serve as more reliable criteria for the determination of graduation-elimination itself.

The study of various measures which might be employed for these purposes continues. In general, the results have not been encouraging



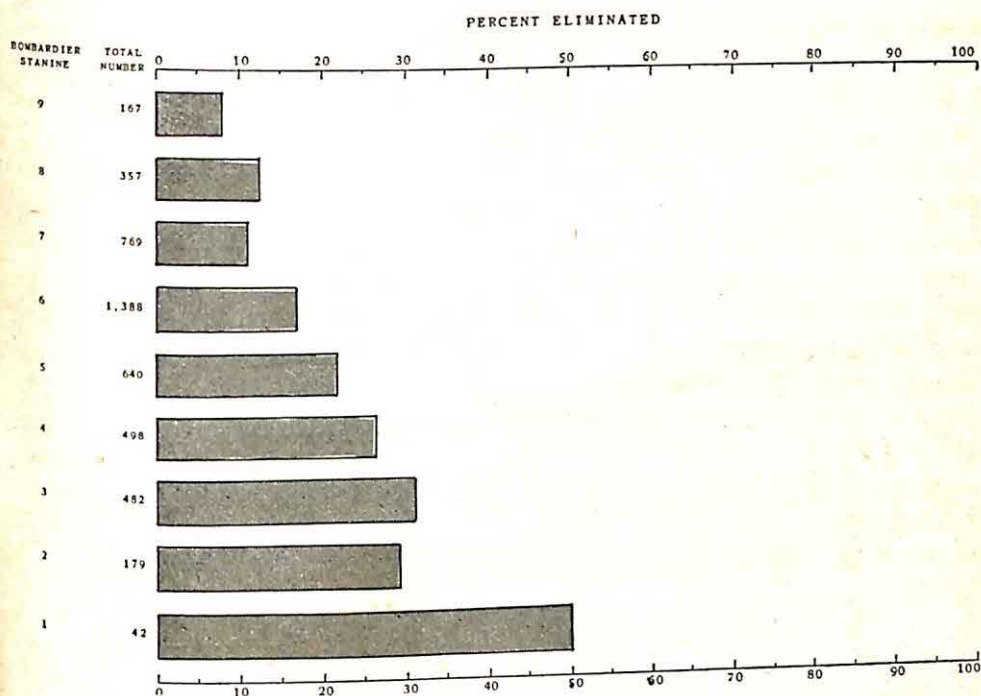


FIGURE II. PER CENT ELIMINATED FROM ADVANCED BOMBARDIER TRAINING.

This includes those eliminated for unsatisfactory progress, fear or own request for each bombardier stanine in four consecutive bombardier classes totaling 4,500 cases. The overall elimination rate is 19%.

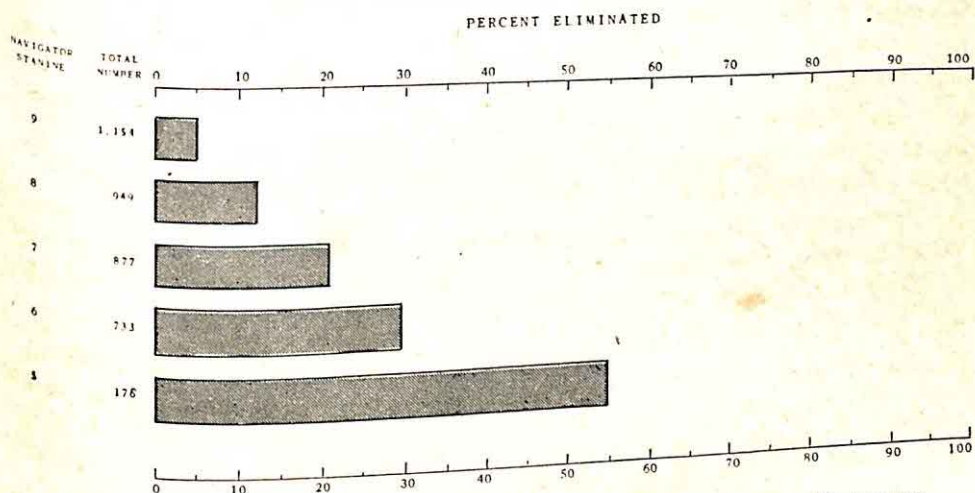


FIGURE III. PER CENT ELIMINATED FROM ADVANCED NAVIGATOR TRAINING.

This includes those eliminated for unsatisfactory progress, fear, or own request for each navigator stanine in six consecutive navigator classes totaling 3,900 cases. The overall elimination rate is 17%.



since, as might be expected, the reliability of most of the measures remains unsatisfactory despite efforts to improve it. Some of the possibilities explored have been grades given in ground courses and in air work, performance on various ground trainers, phase checks and "objective" scales, average circular error in bombing, scores in fixed gunnery training, rankings made by superior officers during operational training (*i.e.*, training in operational training units after graduation from the Training Command), and ratings made by superior officers in combat. Early in 1944, three Psychological Research Projects located at the appropriate Central Instructors Schools were established. The Psychological Research Project (Pilot) is under the direction of Major N. E. Miller, while the Bombardier and Navigator Projects are under the direction of Major E. H. Kemp and Captain L. F. Carter, respectively. These projects are also conducting research in the selection of instructors and in methods of training. The relevance of the problem of criteria of proficiency to these topics is obvious.

#### VI. APPLICATION OF THE CLASSIFICATION TEST BATTERY TO OTHER GROUPS

While the Classification Battery was designed for the selection and classification of applicants for pilot, bombardier, or navigator training, it has also been applied, experimentally, to other groups in the Air Forces and to nationals of our Allies. At the request of those in charge of the Women's Air Force Service Pilot training program, the Battery was administered to a group of women trainees and validated against the graduation-elimination criterion. It was found that, although the performance of the women differed significantly in many respects from that of the men, the validity of the pilot aptitude score was approximately equal in the two groups. This constitutes the only opportunity offering itself, in the course of the war, to investigate sex differences in aviation aptitude test performance.

The Battery has been administered experimentally to aircrew trainees of the Chinese Air Force, and an adaptation was recently completed for the French Air Force. Although adequate validation data for these groups are not yet available, some preliminary findings on Chinese trainees indicate a relatively high degree of relationship between pilot aptitude scores and ratings of flying proficiency made in elementary training. The French authorities are now employing the adaptation constructed for them and validation studies will be possible in the near future. The RAF is also using a number of tests adapted from the USAAF Classification Battery.

Explorations have been made of the potential usefulness of the Battery in the selection of career gunners and various types of specialist gunners, armorer gunners, air mechanic gunners, and radio operator gunners. The validity of the tests for graduation-elimination from aerial gunnery training has been uniformly low and the criterion itself is unsatisfactory because of the low propor-



tion of elimination. Other criteria have been and continue to be investigated but thus far the results have been disappointing.

Just as the Classification Test Battery has been applied to numerous groups, so its possibilities for the prediction of other than success in aircrew training have been explored. One of the major problems attacked has been the effort to detect those individuals who are possessed of the necessary qualities of leadership to make it possible for them to fulfill their responsibilities as officers as well as members of the aircrew. At the present time the AAF commissions some aircrew trainees as 2d Lts. upon their graduation from advanced training while others are issued warrants as Flight Officers. The basis for differential appointment is provided by a Flight Officer Composite Score. This score was developed at the request of the Personnel Division and is a composite obtained from scores on certain of the classification tests, the score on a Flight Officer Final Examination which is composed mainly of judgment items, and a series of ratings obtained from a rating scale upon which each trainee is rated by instructors at various stages of training, with respect to qualities of leadership, judgment, responsibility, military bearing, initiative, self-confidence, force of character, alertness, comprehension, cooperativeness, attention to duty, and professional proficiency. The validation of the Flight Officer Composite Score has never been successfully accomplished because of the absence of reliable and valid criteria of officer quality. Attempts are now being made to discover and develop such criteria, particularly from investigations at the Officer Candidate School and from the voluminous records and ratings in this connection available at the United States Military Academy. It is believed, for example, that some useful information may be obtained as a result of the recent experimental administration of the Classification Battery to some 900 West Point Cadets.

Another problem which has recently received a great deal of attention is that of the selection of men who are qualified for the duties of instructing in pilot, bombardier, navigator, and gunnery training. A number of experimental tests have been developed and validated along with the Classification Battery against various indirect and, in general, unsatisfactory criteria of teaching proficiency. The investigation of such criteria and further research upon this general problem, particularly as it applies to the disposition of personnel returned from combat, is continuing. Most of the work done in the AAF Training Command on this project has been carried out at the three Psychological Research Projects which have worked in cooperation with the Psychological Division, Office of the Surgeon, AAF Personnel Distribution Command.

When a pilot trainee completes basic flying training, he is assigned



either to single engine or twin engine advanced training. The great majority of those who receive single engine training become fighter pilots while most of those who are trained in twin engine planes are subsequently transitioned to medium or heavy bombers. Although job analyses indicate that the skills demanded of the bomber pilot are quite different from those which are necessary for the successful fighter pilot, men have been classified for these specialties almost entirely on the basis of their expressed preferences and their physical characteristics. Since trainees themselves know little about the two specialties, their expressed preferences are highly erratic and based on somewhat peripheral considerations. With a view to differentiating success in operating fighter and bomber planes, studies have been made of the relationship of test scores to various measures of proficiency in specialized pilot training. Much work remains to be done in this area and the newly activated psychological research programs in the four continental air forces are studying this problem intensively.

Recently, combat observation has brought attention to the problems of selecting personnel for lead crews. Since on some missions, especially in the European theater of operations, the success or failure of an entire group may depend upon the effectiveness of a single lead crew, it is of great importance that such crews be composed of the most proficient specialists available. Here again the need for proficiency criteria both in training and in combat is apparent. It is hoped that the efforts of the three Psychological Research Projects and of Psychological Research Unit No. 11 to establish proficiency measures which may be employed at the end of training will be useful in the later assignment of the graduates. A detachment of Aviation Psychologists working recently with the 8th Air Force in England undertook to obtain proficiency criteria under combat conditions, to validate existing tests against such criteria, and to develop and validate new tests which are specifically designed to predict combat performance. Similar research is now underway in other overseas Air Forces.

The ever-increasing importance of radar devices has raised problems concerning the selection of individuals for training in radar techniques and for membership in the radar-specialized pathfinder crews. Investigation of this problem is now in progress but security considerations make it impossible to go into detail at this time.

## VII. TRAINING RESEARCH

Training problems have interested the Air Forces psychologists not only because of their intimate relation to the selection problem but also because many of them seemed made to order for those who had spent years in studies of the learning process. Progress in this line has, how-

ever, been somewhat slower than might have been predicted partly because of the exigencies of the military situation and partly because of the difficulty of obtaining satisfactory proficiency measures. One problem to which a contribution could be made was concerned with the improvement of grading procedures in ground courses. Here the principles of educational psychology were immediately applicable. The Armed Forces has for some time employed rating scales of various kinds, and the experience of psychologists in this respect has been useful. One of the most promising of the training research projects is that of work on various types of ground trainers. Not only do such trainers provide the possibilities for obtaining data on the course of learning, but they also give promise of providing valid and reliable proficiency standards. The activities of psychologists in investigating the problems of training in aircraft recognition have been reported in a previous article by the Psychological Test Film Unit (6).

#### VIII. SPECIAL STUDIES

Many special research projects which do not fall naturally under the headings thus far discussed have been carried out. To give some indication of their scope, a few of the individual projects may be mentioned. A number of studies have been made and will continue to be made on aircraft accidents, particularly on their relationship to the pilot aptitude score and to various experimental tests. The analysis and interpretation of results is difficult because of the complexity of the situation and most studies have failed to yield clear-cut results. There is evidence indicating that trainees with high pilot stanines have fewer accidents per 100,000 hours of flying in elementary training than do those with low pilot stanines. Special studies are now in progress on groups of cases for which the pilot stanine and training evaluation did not agree. Special groups of high stanine eliminees and low stanine graduates at various levels of training have been selected and compared to each other and to high stanine graduates and low stanine eliminees. Studies have also been made of individuals who are held over in training for one or more classes and of those who are eliminated for training for fear or apprehension or at their own request. These cases have, as a group, lower pilot stanines, but it is proposed to attempt to discover what, if any, characteristics are peculiar to them. A number of studies have been made of mean stanines, graduation rates, and validity coefficients for various training classes and schools. Until recently schools have not been homogeneous with respect to pilot aptitude scores represented in their populations and, as might be expected, this has been associated with a heterogeneity of elimination rate from school to school. The relationship between the pilot stanine and elimination rate by school is very significant, as is the



relationship between mean pilot stanine and elimination rate by training class. Despite differences in mean pilot stanine and in elimination rate from school to school and from class to class, however, validity coefficients for schools and classes usually varied only to an extent that would be expected by change.

### IX. PUBLICATIONS

It has been recognized that in a program of such magnitude it is of primary importance to insure that the personnel, no matter how widely dispersed, will be kept cognizant of the work of their colleagues. For that reason the Field Research Unit has routinely published and distributed a number of publication series. A series of Research Bulletins, of which 49 were published in the fiscal year 1943-1944, have reported significant findings of various research projects and the routine validations obtained from various training classes. Nine Technical Bulletins were published in which various technical and methodological questions, mainly of a statistical nature, were discussed. Three Analysis of Duties Bulletins have presented the results of job analyses, while some 23 issues of a publication entitled Research Notes have reported preliminary results or results of minor research studies. Each of the Psychological Research Units publishes its own Research Bulletin series and distributes these throughout the psychological program, while the Office of the Air Surgeon publishes a series of Aviation Psychology Abstracts which describe psychological activities in other agencies in this and other countries. In addition to these publications the psychological groups in the AAF Personnel Distribution Command, the School of Aviation Medicine, and in each of the four continental Air Forces prepare the distribute reports of research. Each Unit in the AAF Aviation Psychology Program also prepares a detailed annual report of activities of research findings.

### X. PROSPECTUS

The foregoing discussion should make it evident that the recent activities within this program indicate a shift in emphasis away from the selection of aircrew trainees for success in training to the selection of those who will make good combat officers. Recently permanent psychological units have been established in each of the four continental air forces. One task of these new units will be to obtain criterion data more closely related to combat proficiency so that the Classification Test Battery and experimental tests may be validated against such criteria. Where possible these units will also assist in selecting men for training in such specialized functions as lead crews and pathfinder crews, using



the results of the classification test battery and of further testing. Each of these units will undertake research in a specified area, such as problems of leadership and motivation, aptitudes required for fighter pilot duty, and accident proneness.

In a further attempt to relate the classification test battery to the combat situation, a revision of the battery has been made which will provide a fighter pilot and a bomber pilot stanine in place of the undifferentiated pilot aptitude score. These scores are approximately equivalent in their validity in elementary pilot training, but the weights for the fighter pilot score place greater emphasis upon speed of reaction and coordination, while the weights for the bomber pilot score place greater emphasis upon maturity of judgment, personal background, and intelligence. These modified weights for the two specialties incorporate, in addition to available coefficients from training sources, validity estimates based on qualitative data arising from observations in the combat theaters and interviews with more than 300 officers in immediate supervision of active combat units in the European and Mediterranean Theaters. Since it is possible to change the weights in accordance with these estimates without materially affecting the validity of predictions with respect to training, it is believed that this procedure is a very desirable one. At the same time, and more or less on the basis of the same type of information, weights have now been established for other combat crew specialties and aptitude scores for various types of gunnery training are being assigned. These gunnery stanines will be made available to personnel officers for use in assigning men to the various specialized types of training but no minimum requirements have been established at the present time.

The search for proficiency criteria in training will undoubtedly gain greater impetus as it progresses. Encouraging results have already been obtained by the Psychological Research Project (Pilot) in an exploratory study of an objective scale of flying proficiency, based on the skill with which certain maneuvers are performed at various stages of the training process. Similarly, the phase check and the ground trainer approach to standards of proficiency in navigator, bombardier, and flexible gunnery training are believed to show considerable promise. Once such reliable and valid criteria have been established, a multitude of training problems will become susceptible of investigation and solution.

In short, while it is not proposed to discontinue attempts to improve the validity of the classification battery for the prediction of success in flying training, it is believed that the solution to this problem has been approximated so nearly that much of the emphasis of the program may be shifted to the advanced problems of combat on the one hand, and the basic problems of training and proficiency measurement on the other.



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## PSYCHOLOGY AND THE WAR: NOTES

*Walter V. Bingham Receives Exceptional Civilian Service Award.* WALTER V. BINGHAM, Chief Psychologist, Classification and Replacement Branch, Adjutant General's Office, and Chairman of the Advisory Committee on Classification of Military Personnel since 1940, received the Emblem for Exceptional Civilian Service at a presentation ceremony Oct. 25 in the office of Major General J. A. Ulio, The Adjutant General. General Ulio made the presentation and Colonel George R. Evans, Chief, Classification and Replacement Branch, AGO, read the following citation:

For exceptionally meritorious conduct in the performance of outstanding service. As chief psychologist of The Adjutant General's Office during the early days of the organization of the Personnel Classification and Replacement Branch, his ability to formulate psychological tests which have become standard in the selection of personnel for initial and specific assignments and his keen foresight and knowledge of psychological problems as applied to the military Personnel Classification System, made him an invaluable aid. The thorough and efficient manner in which he performed his duties gained recognition throughout the entire War Department and the Army, and is reflected in the establishment and acceptance of the Army General Classification Tests and Aptitude Tests as a standard military personnel procedure. He has made a substantial contribution to the military service in time of national emergency.

This highest civilian award conferred by the War Department is recognition of the outstanding service rendered by Dr. Bingham for his work in developing and organizing the personnel system of the Army. Dr. Bingham's interest in this matter has continued since the World War, when he was a lieutenant colonel in the Personnel Branch of the General Staff, and did pioneer work in developing a personnel program for the Army. He was largely responsible for writing the *Personnel System of the United States Army*, published in 1919, which has been of invaluable service in the present war.

*George A. Works to Succeed Leonard Carmichael as Director of the National Roster.* The appointment of GEORGE A. WORKS, of the University of Chicago, to succeed LEONARD CARMICHAEL as Director of the National Roster of Scientific and Specialized Personnel, was announced Oct. 31 by Paul V. McNutt, Chairman of the War Manpower Commission. Dr. Carmichael will continue as Chairman of the Committee on Scientific Research Personnel and as Consultant to the Roster. In accepting Dr. Carmichael's resignation, Mr. McNutt said he did so in order to permit him to devote more time to his duties as President of Tufts College. Before going to Chicago as Dean of Students and University Examiner, Dr. Works had served as President of the University of Connecticut and on the faculties of Wisconsin, Minnesota, and Cornell.

Dr. Carmichael has been Director of the National Roster since it was created in 1940. The Roster has been responsible for placing more than 50,000 professionally-trained men and women in the Army, Navy, war research and war industry. In addition, the Roster has provided detailed information to the armed forces and Selective Service concerning the qualifications of more than 40,000 of its registrants. The information was used in placing these men and women in positions where their specialized training would be of the most effective service in the war program.

"Dr. Carmichael's work," said Mr. McNutt, "in organizing, developing and maintaining a roster of the nation's scientific and specialized personnel has been of invaluable service to the war program."



## BOOK REVIEWS

J. McV. HUNT, (Ed.). *Personality and the behavior disorders. A handbook based on experimental and clinical research.* New York: Ronald Press, 1944. Pp. v+1242, 2 vols.

Psychologists interested in the abnormal and pathological domain will acclaim this Handbook as evidence of the enormous development of that specialty. A glance at the elaborate coverage of topics with ample bibliographies, at least one running to well over 500 items, reveals a growing concern with deviant persons and their actions. Even though the editor intended that the work should deal with personality and its development as well as with abnormalities the primary emphasis is placed on pathology—a telling evidence of the expansion of the abnormal field.

That this work is important follows at once from the comprehensive manner in which it treats facts, research developments, and theoretical issues. There is warrant, accordingly, for a full indication of its general organization, contents, and authorship. The following chapter-listing by parts may also serve as a reference point for evaluating the enterprise as a whole.

*I. Theories of Personality:* (1) The Structure of Personality (D. W. MacKinnon), (2) Personality in Terms of Associative Learning (E. R. Guthrie), (3) Dynamic Theory of Personality (O. H. Mowrer and C. Kluckhohn).

*II. Cross-Sectional Methods of Assessing Personality:* (4) Subjective Evaluations of Personality (E. S. Jones), (5) Personality Tests (J. B. Maller), (6) Interpretation of Imaginative Productions (R. W. White).

*III. Behavior Dynamics, Experimental Behavior Problems, and Hypnotism:* (7) Clinical Approach to the Dynamics of Behavior (T. M. French), (8) Physiological Effects of Emotional Tension (L. J. Saul), (9) Experimental Analysis of Psychoanalytic Phenomena (R. R. Sears), (10) Level of Aspiration (K. Lewin, T. Dembo, L. Festinger, P. S. Sears), (11) Outline of Frustration Theory (S. Rosenzweig), (12) Conditioned Reflex Method and Experimental Neurosis (H. S. Liddell), (13) Experimental Behavior Disorders in the Rat (F. W. Finger), (14) Experimental Studies of Conflict (N. E. Miller), (15) Hypnotism (A. Jenness).

*IV. Determinants of Personality—Biological and Organic:* (16) Heredity (L. S. Penrose), (17) Constitutional Factors in Personality (W. H. Sheldon), (18) Personality as Affected by Lesions of the Brain (S. Cobb), (19) Physiological Factors in Behavior (N. W. Shock).

*V. Determinants of Personality—Experiential and Sociological:* (20) Infantile Experience in Relation to Personality Development (M. A. Ribble), (21) Childhood Experience in Relation to Personality Development (L. B. Murphy), (22) Adolescent Experience in Relation to Personality and Behavior (P. Blanchard), (23) Cultural Determinants of Personality (G. Bateson), (24) Ecological Factors in Human Behavior (R. E. L. Faris).

*VI. Some Outstanding Patterns of Behavior Disorder:* (25) Behavior Disorders in Childhood (L. Kanner), (26) Delinquent and Criminal Personalities (L. G. Lowrey), (27) Unfit Personalities in the Military Services (A. W. Stearns), (28) The Psychoneuroses (W. Malamud), (29) The Functional Psychoses (N. Cameron), (30) The Concept of Psychopathic Personality (P. W. Preu), (31) Seizure States (W. G. Lennox).

*VII. Some Investigated Correlates of Behavior Disorder:* (32) Psychological Deficit (J. McV. Hunt and C. N. Cofer), (33) Electroencephalography (D. B. Lindsley).



VIII. *Therapy and the Prevention of Behavior Disorders*: (34) *Psychiatric Therapy* (K. E. Appel), (35) *The Prevention of Personality Disorders* (G. S. Stevenson).

Of the authors 22 are psychologists, 11 psychiatrists, 3 anthropologists, 2 neurologists, 1 physiologist, and 1 sociologist, though several are listed under two headings, for example, psychology and physiology or psychology and psychiatry.

As the outline indicates, the mass of content makes it impossible to summarize the material treated. It ranges from the extreme of practical child psychology, including suggestions for infant training, through many variations on Freudian themes, important summaries of literature in the style of *Bulletin* articles, standard textbook descriptions of psychiatric materials, summaries of special experimental findings as in the chapters on encephalography, behavior disorders in animals, aspiration level, and conflict, to basic psychological and psychiatric theory. In quality of writing the contributions vary considerably, many indicating a deep understanding and judicious presentation of the subject treated, whereas a few resemble elementary textbook chapters. Another not too pleasing feature of the work as a whole is the excess of repetition. While much of this could not be avoided under the general plan of the work, those who read the chapters consecutively can not escape the impression of overload and overlap.

Since in the preface the editor has offered a detailed statement of his aims in producing this work, a reviewer can do no better than to assay the results in terms of those aims.

In the first place, the editor has not achieved his desire for a Handbook so far as concerns Personality. The inadequate coverage of theory and fact pertaining to normal individuals may perhaps be accounted for by his belief that psychoanalysis has been one of the dominant influences in personality study. This belief, too, is basic to the fact that the aim to include contributions from the various life sciences has resulted mostly in varying statements of the psychoanalytic story.

Next it was the editor's intention to bring together scientific illustrations of the molar or whole character of organisms or persons; yet a large share of the material stresses only their partial character. Of the divergent points of view represented some emphasize psychic powers and principles; others argue for the basic character of nerves and muscles. Not lacking, of course, is the protestation that the part is the whole. Perhaps in this instance the inclusion of an objective field statement of personality would have supplied a corrective.

Again, in the title the editor uses the term Behavior instead of Mental Disorders to avoid implying dualism. Nevertheless we find prominently represented such doctrines as "Consciousness is a function of the brain" (270) and "There are normal psychic influences upon the gastrointestinal tract" (273). The general formula is that "emotions" affect physiological activities. This "psychosomatic" doctrine is vigorously criticized by one of the other contributors (867). Still another author, whose contribution carries the disarming title "Personality as Affected by Lesions of the Brain," asserts with strong conviction that "The brain is the organ of mind" (554), and "Only by accepting psychology as a part of physiology can one make any sense out of it" (575). Undoubtedly this same attitude is responsible for his belief that it is scientific to argue that there is a mind as well as a brain and that this brain-organ stores memories, though in an unknown manner. With very few exceptions the contributors are not really concerned with personality events, but with traditional



personality doctrines. The lead which Cameron (868) ascribes to Adolf Meyer of treating functional psychoses as reactions of an individual to social environment has not been followed by many who work with behavior disorders.

Once more, though the editor intended his work to assemble the major portion of theory, investigative fact, and clinical practice, it is after all a parochial enterprise. It is true that many phases and sub-fields are included, but the general blueprint of the work was borrowed mainly from a psychoanalytic textbook of psychiatry. Hence the limited mention of personality theories and the scarcity of a general naturalistic treatment of behavioral variants. There is even a paucity of discussion concerning numerous items of behavioral disorders, notably those of a perceptual or performative type. When perception, reaction time, and other performance disorders are mentioned, they are treated as deficits in persons suffering from the traditionally named psychoses. Here perhaps is a basis for distinguishing between the holistic philosophy of the work and a factual view concerning maladjustments.

And finally it is unfortunate that the volume does not correspond with the editor's entirely correct conviction that normal and abnormal personalities differ only in degree. Unquestionably, the work as a whole is colored by too sharp a differentiation between the two; especially is this true of the writers with organic or neural predilection. On the other hand, the chapter concerned with the concept of psychopathic personality (30) leaves no doubt how thin is the line separating the normal from the pathological.

The critical reader may conclude that these volumes do not adequately mirror the psychological situation in the abnormal field and that despite their excellent features they do not satisfy the basic Personality Handbook requirements. Nevertheless he cannot escape the conviction that this is a worth-while and useful work.

Indiana University

J. R. KANTOR

WINN, RALPH B. *Encyclopedia of child guidance*. New York: The Philosophical Library, 1943. Pp. xvi + 456.

This volume, printed in small type, two columns to a page, is the work of 74 listed authors representing a wide variety of backgrounds, professional activities, and geographical locations. The table of contents lists 215 topics, many of which have sub-headings in the text discussions. The topics range from *Ability*, *Acceleration*, *Acceptance*, through *Mooseheart System*, *Motivation*, *Music*, to *Vocational Guidance*, *War Effects*, and *Wishful Thinking*. It is reassuring to the reader that practically all the discussions are signed.

It is this reviewer's judgment that the individual articles represent a generally high quality of concise statement for the obviously restricted space. For a volume which includes so many inter-related and over-lapping topics discussed by different persons, the editor and the contributors have achieved a consistency in point of view beyond one's reasonable expectation.

The publisher's announcement states, "The book deals with all phases of child guidance and its many ramifications in psychiatry, psychology, education, social and clinical work. Designed as a guide for physicians, psychiatrists, and clinicians, social workers and educators, because of its simple and clear presentation, it can be used by the intelligent parent as well.—The librarian and research worker will find it an up-to-date reference book." No one reads all of an encyclopedia; workers in each of the above fields can find in this volume something which they can use.



A librarian or a research worker, expecting an up-to-date reference book, would be at a loss to find five pages devoted to *Dreams* and one reference, which states merely "Freud, S.: Interpretation of Dreams" (127); or, two pages discussing *Masturbation*, followed by the single, simple reference "Freud, S.: Three Contributions to the Theory of Sex" (236). Each of these difficult topics merits more than one reference. Some topics have excellent lists of references. Thirty-five references are given for the four and one-half page article on *Nursery Schools*. Throughout the volume, however, there is no consistency of style in reporting the references, a matter which might have been subject to better editorial control.

An example of unevenness of treatment will be discovered by the reader who looks for a discussion of *Growth*. On page 179 he is referred to *Development*, *Maturation*, and *Organismic Age*. In an excellent discussion of *Development* the reader finds, among other things, the statement, "The present writer thus despairs of a consistent use of such a term as 'maturation'." (107). Neither the editor nor the author of the discussion of *Maturation* appear thus to despair. But after reading several times the article on *Maturation* (236-238), this reviewer still fails to find a consistent use of the term.

The reviewer regards as distinctly unsound the advice given in an unsigned paragraph under the heading *Question-Asking* (347). When a two-year-old child asks why? what? or who?

It is easier to satisfy his curiosity or interest by reference to the world of fairy tales and familiar mythology, till a certain level of intellectual maturity is reached, than by reference to science. A scientific explanation may be as much out of place for the child as a mythological one is for the educated adult. The young child will not comprehend the physiological truth of birth or death; there may be no other way than to tell him the stork tale or "a long trip" story till a more factual explanation can be given (347).

In answering the questions of a small child what legitimate substitute is there for truth? Why should not simplicity and directness in the answer be in proportion to the simplicity and directness of the question?

The inclusion of the discussion of *Heredity* (184-186) represents an almost inexcusable editorial oversight. The article contains two columns of "evidence" on the influence of heredity that was discredited twenty years ago. The findings of the studies of the Jukes and the Kallikaks should not be offered uncritically in 1943 as evidence of "the inheritance of traits and tendencies toward criminality and degeneracy," or of "the heredity trend with regard to mental and moral defect." This article also contains a table of coefficients of correlation to illustrate "trait resemblances," and fails to indicate the nature of the "traits" which were used in the correlations.

In all probability the book will be of most use to undergraduate students for topical orientation.

HAROLD H. ANDERSON

University of Illinois

MENNINGER, KARL. *Love against hate*. New York: Harcourt, Brace and Company, 1942. Pp. ix + 311.

For many years Sigmund Freud stubbornly persisted in making shift without recognizing the autonomy of aggressive impulses in human nature. At one time he conceived of love and hate as but two poles of the libido. At another time he saw in his doctrine of narcissism a way to dispose of Adler's theory of aggression. The frustrated love-impulse was regarded as turning or returning



from a heterosexual or social direction to fixate upon one's self as love-object (ego-libido). Only during the horrors of the First World War did it dawn on Freud that perhaps hate (aggression or hostility) was a second instinctual tendency as strong as, if not stronger than love. Finally came his formal declaration of the actual existence of two separate and antagonistic instincts in human nature: the love-instinct and the death-instinct (Eros and Thanatos). This death-instinct conceived as directed against oneself he called the aggression-instinct when directed against others. The repressant to the love-instinct is now conceived as one's own or others' hostility. Here at last the possibility was given of bringing Adlerian psychology back into the psychoanalytic fold. The detailed elaboration of this new manifesto and much theoretical reconstruction rendered necessary by this belated insight Freud left largely to others. In *Man Against Himself* and in the present volume, *Love Against Hate*, Karl Menninger has taken upon himself in excellent wise just these tasks.

It is the thesis of *Love Against Hate* to show how the aggression-instinct is commonly fostered through frustration of the love-instinct and to indicate measures for counteracting the luxuriant growth of hatred in the world. Frustrated parents frustrate the love-impulses of their children in mostly unconscious ways, thereby making for later frustrated adult men who in turn frustrate their wives and for later frustrated adult women who in turn frustrate their husbands, their children and other women. The very first step towards breaking of this vicious circle of aggression begetting aggression is in becoming aware to ourselves of our aggression of which we are all too often unconscious. This step is the *sine qua non* of gaining the mastery of our hostility either through neutralizing it with the love-energies *i.e.* through eroticizing the aggressive energies or else through a sublimation of hostility *i.e.* through substituting socially sanctioned objects for our aggression.

A chapter apiece is then devoted to work, play, faith and hope as means of absorbing or subduing our aggressive energies. To be valuable in this connection work must not be a neurotic compulsion either in aggressive competition with one's father or in an aggressive rejection of parental hopes but should be rather "a pleasure in itself," a spontaneous self-realization of one's love-impulses. Play provides a wholesome catharsis for impulses either aggressive or erotic which have been denied satisfaction by reality. Faith of the mature type makes one face reality without illusion and without fear but with an inmost conviction that one is consecrating his life to that which he feels to be of transcendent worth not only to himself but for all mankind. Hope, if of the mature type, keeps within the frame of external reality and anticipates immortality in one's progeny. It is this kind of hope for immortality that makes for wanted children and insures their loving care, once they are born.

Reserved for the last chapter is consideration of love, the means *par excellence* in the conquest of hate. Instead of cultivating hostility within our young by frustrating their love-impulse it is a matter of nurturing their erotic energies through an encouragement of love to non-human beings and inanimate things and to fellowman, but chief of all through a fostering of naturalistic *i.e.* life-affirming attitudes towards the sex-life itself.

Probably that which in this book impresses most the reviewer is the somewhat tardily achieved *rapprochement* of the new psychoanalytic love-therapy with the Pauline gospel of *charitas*, the Adlerian doctrine of *Gemeinschaftsgefühl* and Kerschensteiner's *Sozialpädagogie*.



BOND, GUY L., & BOND, EVA. *Teaching the child to read*. New York: Macmillan, 1943. Pp. ix + 356.

The clinical psychologist who works with children, often meets the problem of the child who is slow or backward in reading. Few, if any, of the many books which have been written on the teaching of reading, offer such a definite program which utilizes the results of research and recognizes and understands the needs of children as this new book by the Bonds. Although written for the classroom teacher, the mode of presentation is so simple and concise and the sequence is so logical, that it lends itself readily for use as a handbook by the clinician.

*Part I. The Child Goes to School*, depicts the complicated nature of the child's initial adjustment to school, establishes a need for reading, describes the kind of reading skill one wishes to develop, and shows the wide range of ability to be met in any one class.

In three chapters of well-chosen material, *Part II. The Child Gets Ready to Read* stresses the principle that children should not be rushed into reading or pushed ahead too rapidly without foundations. Reading readiness is conceived of as mental, physical, personal, emotional, and educational, and methods of appraisal based upon research are described for each of these phases. An outstanding contribution is an easy-to-interpret tabular presentation of the methods for evaluating reading readiness factors (Table II, 48-54).

The four chapters of *Part III. The Child Begins to Learn How to Read*, are devoted to the theories and methods of teaching reading in the primary grades. All the usual methods of instruction are described in detail. The authors take the view that no one method suffices alone, and that a good teacher will select the best phases of each method to develop her own composite method and will remain alert always to needed modifications for individual pupils. The reader is reminded repeatedly that good instruction is individualized but the evils of group reading can be minimized by the use of standardized appraisal methods for classifying pupils and by careful choice of materials.

*Part IV. The Child Becomes an Independent, Extensive Reader*, contains five chapters on the continuation of reading instruction and appraisal throughout the elementary school period. Attention is directed toward the new types of reading experience which confront the child after mastery of the basic principles: reading for comprehension in content subjects; the interpretation of charts, maps, graphs; the use of reference materials; the enlargement of reading tastes and interests; and finally the continuation of reading as an incidental rather than a specific subject. A useful directory of reading tests for elementary school pupils, tabulated by name, grade level, abilities measured, number of forms, time required to administer, name of publisher, and year of publication is presented.

Selected references through the year 1942 relate to pedagogy, experimental research, tests and measurements, curriculum development, and individual differences, and are oriented from the viewpoint of reading instruction.

This reviewer is of the opinion that the authors have succeeded admirably in contributing a concrete and definite program for teaching the child to read and including, without confusing the reader, many understandings about child nature and child behavior which, though not technically a part of the reading act, must be recognized and directed if the child is to become an able reader. Paradoxically, this concreteness and definiteness of program also provokes the book's chief criticism. In providing what amounts to a step-by-step recipe for teaching reading, it invites abuse or misuse by the non-professional who would attempt



to teach reading without a real understanding of underlying physical, mental, social, and emotional processes.

It would have been helpful if the authors had also included suggestions on methods of meeting the impatience of parents and supervisors who bring pressure for immediate and tangible results, a problem in human relations for both the teacher and clinician.

ELIZABETH MECHEM FULLER

*University of Minnesota*

LAWTON, GEORGE (Ed.). *New goals for old age*. New York: Columbia Univ. Press, 1943. Pp. 201.

A collection of lectures seldom, almost never, makes an easy book to review. The lectures are likely to be divergent in aim and uneven in execution. This book is no exception.

The lectures originally formed part of a course for social workers dealing with the aged. Perhaps this accounts for a strong impression in some chapters that only the indigent (or in one chapter by a psychiatrist, the wealthy) grow old. As is perhaps natural, several chapters are essentially a pep talk on the theme that it isn't too bad to be old. Frankly here I prefer the writings of the belle lettrist from Cicero on down to Santayana.

Lawton's own chapter on the aging of mental abilities is eclectic and quite comprehensive. It is the only chapter making extensive use of factual data. L. K. Frank shows that his view of the way personality develops in our culture can be made to yield new insights on old age. Ollie Randall gives us a sensitive analysis of the problems of the older person in the family.

But even for this chapter and still more for most of the others one echoes what Alice Bryan says in her chapter on bibliotherapy: we must pass beyond the anecdotal stage in formulating principles.

The 14 page bibliography shows that much progress has been made toward a more scientific formulation of gerontology; but this fact is inadequately reflected in the lectures.

*Ohio State University*

HORACE B. ENGLISH



## NOTES AND NEWS

W. H. COWLEY, who recently resigned as president of Hamilton College (Clinton, N. Y.), has been appointed professor of education, Stanford University. He will take over his new duties at the beginning of the Spring quarter.

LEO M. HAUPTMAN, director of secondary education and psychologist for the public schools of La Porte (Ind.), has been appointed registrar and director of student personnel, Kalamazoo (Mich.) College.

PHILIP F. ASHTON, director of guidance and personnel and teacher of psychology and sociology, has returned to Seattle Pacific College as executive vice-president, after having spent one year on the staff of Houghton (N. Y.) College and one at Wheaton (Ill.) College.

G. WILSON SHAFFER, dean of the College of Arts and Sciences at the Johns Hopkins University, is visiting professor of psychology at Goucher College during the first term of the present college year.

WILLIAM D. ORBISON, former instructor in psychology, Connecticut College (New London), has been appointed instructor in psychology at the University of Connecticut.

DONALD L. QUINSEY has been promoted from instructor to an associate professor in psychology at the University of Maine (Orono).

SAMUEL B. KUTASH, psychologist, Woodbourne Institution for Defective Delinquents (Woodbourne, N. Y.), has been appointed chief psychologist at the Harlem Valley State Hospital (Wingdale, N. Y.) to take charge of the new psychology department.

ZELMA WHITTENBERG has been appointed assistant professor of education and psychology at Westminster College (New Wilmington, Pa.).

W. E. DANNER has been added to the staff of Oberlin (Ohio) College, as lecturer in psychology.

C. A. MACE, university reader in psychology at Bedford College, University of London, has been appointed to a professorship at the Birbeck College of the University.

HARRY L. HOLLINGWORTH, professor of psychology at Columbia University, has given \$51,000 to establish a fellowship at the university in memory of his wife, Leta Stetter Hollingworth, professor of education at Teachers College, who died in 1939. The fellowship will be awarded annually to a woman graduate of the University of Nebraska who "is most likely to emulate the character and career of the late Mrs. Hollingworth."

Owing to an unprecedented demand, due in part to war conditions, the seventh edition of the *Biographical Directory of American Men of Science*, published in March, 1944, was exhausted immediately and many orders could not be filled. A second printing has just appeared and the *Science Press*, Lancaster, Pa., is again taking orders.

*Georgia School of Technology Establishes a Department of Psychology.* The Georgia School of Technology has established a department of psychology which is charged initially with four functions: 1. Developing a program of course offerings in general and applied psychology suitable to supplement the engineering training offered by the School. 2. Planning and carrying on a freshman testing schedule designed to assist in sectioning classes, to provide diagnostic data, and to yield measures predictive of probable success of entering students. 3. Investigating and reporting on a counselling and research program suitable to the School. 4. Participating in the work of the Veterans' Center now being organized on the campus. The appointment of a department head is



## BILINGUALISM

Bilingualism, or the use of two languages by the same person, is as old as the first occurrence in human history of mutually understood traffic between two peoples speaking different languages. The proximity or coexistence of two or more languages in the same political or geographical area has resulted in bilingualism. Bilingualism in its more inclusive sense is to be found in almost every country in the world today. It occurs in the families resulting from mixed marriages; among government officials, business men and missionaries in foreign lands; and among educated people who learn a second language for use. In a much more definite form it is present in all countries where there are language minorities; in political units like Switzerland, Belgium, and the Union of South Africa which are constituted of equally recognized language groups; in countries of immigration and colonization; and in geographical areas where two languages or political units meet each other.

Bilingualism is a widespread phenomenon. In Europe today 120 languages are spoken (19), and the people speaking these languages are not enclosed in neatly drawn political or geographical boundaries. Outside of Portugal, Iceland, Lichtenstein, Monaco, and St. Marin there is no country or principality in Europe that does not have one or more language minority groups. In the United States it is estimated (1) that 25% of the population is bilingual because of the fact that the immigrants continue at least a partial use of their vernaculars for two generations of their residence in the adopted country. Canada is confronted with the problem of bilingualism by virtue of the presence in that country of a large number of recent immigrants and the French-speaking population in the province of Quebec. The increasingly large number of immigrants in recent decades in the South American countries has augmented the number of bilinguals in those territories. Into the African and the Asiatic continents with their teeming nations and languages have come during the past several centuries of political expansion and imperialism the European languages of English, French, Danish, German, Portuguese, and Spanish. An illustration of this linguistic kaleidoscope is the Magh in India, "The Magh" writes West (38, p. 14), "has Maghi as his home language; he needs Bengali for local commerce, English for higher education and administration, Burmese for his ancient traditions and literature."

The monoglot, especially the one from a small language group, is at a tremendous disadvantage: he must either share in the present civilization and therefore become a bilingual, or forego the benefits of it for the sake of his monoglotism. H. G. Wells (37, p. 248) stated the matter succinctly at the beginning of this century:

The inducements to an Englishman, Frenchman or German to become bilingual are great enough nowadays, but the inducements to a speaker of the smaller



languages are rapidly approaching compulsion. He must do it in self-defense. To be an educated man in his own vernacular has become an impossibility. He must either become a mental subject of one of the greater languages or sink to the intellectual status of a peasant.

Since the time of Wells' statement the compulsions to become bilingual have increased very greatly. The dimensions of the world have shrunk and continue to shrink daily; men, large numbers of them, are working, fighting, and will be living or travelling tomorrow in foreign lands thousands of miles removed from their country and their home language. Since the beginning of the century when Wells wrote his *Anticipations* two world wars have been fought, each causing large shifts of populations, each obliterating earlier political boundaries, and each resulting in greater interspersions of language populations. The progress since the beginning of the century in means of travel on land, sea and in the air, and the channels of communication by means of the printed word, the radio and the sound-pictures have been nothing short of miraculous. And the use of television is not far off. The number of commercial enterprises spanning several countries and even continents has increased; the number of international conferences, of international organizations and operations of one kind or another has been tremendously augmented and will continue to be so in the post-war world. All these trends will enhance and emphasize even more than heretofore the interdependence of men and nations; they will necessitate media for communication surpassing narrow ethnic boundaries; and they will further reduce the opportunities for a monoglot, especially if he belongs to a small language group.

### A WORLD LANGUAGE

In the light of the trends described above, and foreseen by scholars as well as by philanthropists long ago, several proposals and attempts have been made to create an international medium of communication—a world auxiliary language. These proposals may be classified into three categories:

1. Wider extension of an existing national language—English, French, German, Spanish, Bengali, etc.
2. Creation of an artificial language based on the elements of some existing languages—Volapük, Esperanto, Ido, Romanal, Latino sine flexione, Novial, Occidental, etc.
3. A simplified form of an existing language—Basic English, Basic Chinese, etc.

Of these various schemes Basic English recently received a tremendous boost from a highly influential source. Winston Churchill, the Prime Minister of England, in his speech at Harvard University on September 6, 1943 expressed himself thus:



guage. Others have decried the evil effects of bilingualism which they believe results in mental confusion, in inadequate mastery of either language, and in cultural uprootedness (*déracinement*). One writer (15, p. 18) goes so far as to declare: "If it were possible for a child or boy to live in two languages at once equally well, so much the worse for him. His intellectual and spiritual growth would not thereby be doubled, but halved."

During the current century, and particularly after 1920, experimental methods were applied to the investigation of this baffling problem. And, as usual, careful scientific inquiry by breaking the problem into its many parts, disclosed bilingualism to be not a simple condition about the effects of which sweeping generalizations could be made, but a complex problem with many aspects about each of which only the scientist's guarded and carefully limited generalizations would be permissible.

#### A. Measurement of Bilingualism

Bilingualism is not a uniform phenomenon; not all bilinguals use their two languages with equal degree of efficiency, and the degree of efficiency will vary in the life of the very same individual. For purposes of scientific study the term "bilingualism" must be defined, delimited, and, if possible, measured. The attempts at the measurement of bilingualism may be classified into three categories:

1. *Background Questionnaires.* Prescott's report to the convention of the New Education Fellowship in Nice, 1932 (4) described a bilingual questionnaire of 20 items, some of which follow:

1. What is the first language which you spoke?
2. What language does your father speak to your mother usually?
6. In what language does your father speak to you usually?
7. In what language do you usually speak to your father?
15. Are there in your home newspapers and magazines which are not in the English language?
16. Do you read them?
20. Have you been in a school where the teachers did not always speak in English with the pupils? What language did they use?

One point is assigned to each item indicating use or influence of the foreign language, and the sum of these points is the index of the foreign language influence in the family background of the child.

Hoffman (11) in 1933 developed his Bilingual Schedule which consists of fourteen questions, including altogether thirty-seven items purporting to determine the amount of the bilingual background of the child. Not only the "expressive," or speaking, but also the "impressive" or hearing and reading, aspects of the child's language situation are taken into account. The following are typical questions in the Schedule:



Question 1. Do the following speak to you in any language other than English?

(a) *Father* Never Sometimes Often Mostly Always

(b) *Mother* Never Sometimes Often Mostly Always

The same question is continued for grandfather, grandmother, brothers and sisters, relatives.

Question 2. Do you speak to the following in any language other than English? (The above six categories are repeated here.)

Other questions pertain to newspapers, magazines, books, letters received at home, written, or read by the members of the family or by the child himself. The questionnaire is scored by assigning numerical values of 0, 1, 2, 3, 4 to the items respectively of *Never*, *Sometimes*, *Often*, *Mostly*, and *Always* as underlined by the respondent. The numerical total thus received is then divided by the total number of items attempted by the child, and the quotient, multiplied by 10 in order to get rid of the decimal, constitutes the child's bilingual score. Hoffman reports a validity coefficient of .82, and a reliability coefficient of .92 (split-halves) for his questionnaire.

2. *Association Techniques and Knowledge Tests.* M. Gali of Spain (3) has proposed two methods for the measurement of degree of bilingualism. The first of these methods is a test of immediate verbal memory. Two parallel series of 10 words—10 in Spanish, and 10 in Catalan, are orally presented to the child, each series being read three times with a fixed time interval in between the words. At the end of the presentation the children are requested to reproduce on a piece of paper the words which they are able to recall. In this manner the degree of familiarity with either language is measured.

A second method proposed by Gali (3) uses the chain association technique. Eight words, consisting of four nouns and four adjectives in Spanish and in Catalan are given alternately and the child is asked to give within a fixed time any words in either of the two languages that come to his mind.

Miss Hywella Saer (3) has used a slightly different and quite an ingenious association method to measure the affective value of words in the two languages of the bilingual child. Fifty words representing situations, persons, objects, and actions that normally are part of a child's world at the age of three are selected. These fifty words in English and their equivalents in Welsh (making a total of one hundred words) without any definite order of presentation as to the English or Welsh words are given to the child individually. The responses given in either language are noted. Account is taken of the association time for each word in each of the two languages. The association time for the Welsh word is divided by the time of the association for its equivalent in English. This quotient is equal to 100 when the association times for the two responses are equal. A score less or more than 100 will indicate the greater or smaller affective value of the situation, ob-



a. On the whole, the older the bilingual child and the higher the level of his educational attainment, the smaller is the discrepancy between his verbal intelligence test performance and the performance of a monoglot of the same age or educational attainment.

b. The verbal intelligence tests show that the apparent retardation of bilingual children varies from place to place and from group to group. Bilingual children in urban areas, like the Welsh children in the cities and the Jewish children in London or New York, show either no retardation or a slight superiority to the norms of monoglot children, while in rural Wales the Welsh children, and in the southwest of the United States the Spanish-speaking children according to these verbal intelligence tests show a serious handicap.

This summary points to the conclusion that bilingualism neither retards nor accelerates mental development, and that language handicap is most likely the factor responsible for the discrepancy between the performances of bilingual and monoglot children on verbal tests of intelligence.

### *C. Bilingualism and Language Development*

Several individual studies of language development of bilingual children have been made by parents. The classical study in this field, and the most careful, is that of Jules Ronjat (24). In 1913 Dr. Ronjat reported in great detail on the linguistic development of his bilingual son, Louis. From the time of Louis' birth, his father spoke French and his mother spoke German invariably in the presence of the child or in speaking to him after he was able to talk. According to Ronjat, Louis' accent, pronunciation, and knowledge of the two languages were not retarded in any way because of his bilingualism. In 1923, ten years after the publication of his monograph, Dr. Ronjat in a private communication to Dr. Michael West (46: 59-60) was able to confirm his earlier statement regarding the normal development in the two languages of his son, Louis.

Several other developmental studies of this type summarized by Spoerl (30) seem to indicate that whenever the sources of the two languages were kept distinct and the manner of presentation remained consistent during the early developmental period the situation was normal. However, when the process was interfered with, as when the mother spoke sometimes German and at other times English [Leopold (16)], or when child was moved from a bilingual to a unilingual environment, or vice versa [Volz (33), Smith (27), (28), Kenyeres (14)], difficulties arose, such as refusal to talk in one of the two languages learned, or some confusion and retardation in language development, at least temporarily. In this connection one should bear in mind the situation in numerous second generation immigrant homes in the United States, where the parents speak English to the child while the grandparents



consistently use the language of the old country, with no permanent ill effects on the child's language development.

Two studies of the language development of preschool children give somewhat divergent results. McCarthy studying children from foreign language homes in the United States concludes (18, p. 66): "... the hearing of a foreign language in the home does not seem to be a handicap in linguistic development as it is measured by the mean length of response, which when applied to larger groups has proved a very reliable index."

Smith studying an extensive sampling of children in Hawaii from Chinese, Filipino, Hawaiian, Japanese, Korean, and Portuguese-speaking homes finds serious language handicap in children from two to six years of age. Two of her conclusions are pertinent:

The children in Hawaii were compared with a monolingual white American group previously studied. They are found to use more exclamatory and slightly fewer interrogative sentences, and to make much less frequent use of complex and compound sentences. Sentences that serve merely to name an object or person continue to a later age than with monoglot children. However, age trends are found to be similar, for exclamatory and naming sentences decrease; questions, answers, and complex and compound sentences increase with age (29, p. 268).

(And again.) The evidence, although insufficient, suggests that pidgin English is more responsible for incorrect English and bilingualism for the overuse of interjections, short sentences, immature type of questions when classed as to meaning, and lack of complex sentences (29, p. 272).

While the difficulties encountered by the bilingual child in his early period of language development are of interest, and must be provided for in an educational program, it is of greater interest to know whether or not these difficulties are permanent. As Braunshausen (5) remarks: "Si l'on veut définitivement établir le bilan du bilinguisme, il faut organiser des enquêtes et des expériences, non pas sur le bilinguisme en *statu nascendi*, mais le bilinguisme a l'état achevé."

It is necessary, therefore, to canvass the studies of the language development of bilingual children on successively higher educational levels. Most such studies cover the elementary school period. There are a few on high-school level, and very few indeed on the college or more adult levels. The usual method in these studies has been to compare the vocabulary size of the bilingual child with that of his monoglot contemporary. A few investigators, notably Gali in Spain and Frank Smith in Wales, have analyzed letters and compositions of bilingual persons. These studies have been summarized by Arsenian (1) and Spoerl (30) and will not be presented here in any detail.

The results of these studies are not uniform. Certain of the studies, notably those in Puerto Rico, in the southwest of the United States,



and in rural Wales show rather serious vocabulary handicap for the bilingual child in both languages. Other studies, notably those in urban centers of the eastern part of the United States, show equality with monoglots, or in a few instances even a larger size of vocabulary in the English language by bilinguals as compared with monoglots. The explanation of these apparently contradictory findings is to be sought in the following:

1. The higher we go on the educational level the more opportunity does the bilingual child have to catch up with the monoglot in his knowledge of the vocabulary of the dominant language. Terman's finding is of great interest in this connection. He discovered (34) that for the bilingual student, vocabulary is lower than mental age up to the third or fourth grade, but that after twelve years of age vocabulary is equal to mental age. This result receives some corroboration in the findings of Decroly in Belgium (8), and Saer in Wales (25).

2. The higher we go on the educational level the greater the selection of bilingual students, since, as the New York Regents inquiry shows, a larger percentage of bilingual children leave school than of monoglots (9). Intelligence and language facility are probably two of the factors in this selective process.

3. There is truth also in the statement of the Canadian committee appointed to inquire into the conditions of the schools attended by French-speaking pupils, namely, that proficiency in the use of one language is assuredly no barrier to securing equal proficiency in the other *if proper methods of organization and instruction are followed.*" (42, p. 220) (italics by the writer)

On the whole, these studies show a language deficiency for the bilingual child. However, the extent and period of such deficiency seem to depend on certain factors, such as, the extent of educational opportunities, the intelligence of the bilingual children, and the methods of organization and instruction in schools.

#### *D. Bilingualism and School Achievement*

The bilingual's deficiency in language reflects in his school performance, especially on the elementary school level. Studies reported from Belgium [Toussaint (35)], Czechoslovakia [Couka (40)], Canada (42), the Philippine Islands (43), Puerto Rico (44), and a number from this country [summarized by Spoerl (30)] are almost unanimous in showing lower performance by the bilingual child. This deficiency of the bilingual is most apparent in verbal subjects, such as reading, history, and geography; and is much less apparent in non-verbal subjects, such as arithmetic and science. On the high school level—there are few satisfactory studies—the differences seem very slight, and on the college level they apparently disappear. The most satisfactory investigation on the college level is that of Spoerl, who equated two groups of Freshmen—bilingual and monoglot—as to age, sex, socio-economic status and intelligence, and compared their performances on the Nelson-Denny Reading and the Purdue English Placement tests, in addition



to examining their school grades and progress. Dr. Spoerl (32) concludes her study with the following statement:

Summarizing the conclusions based on the various tests which were administered, it becomes clear that at least at the college level, there are no continuing effects which stem from a bilingual childhood and which show themselves in the academic records, vocational choices or English ability of bilingual students. Neither does bilinguality seem to have a significant effect on the performance of college age students on a verbal test of intelligence. If there were a bilingual handicap in their childhood, it has certainly become stabilized by the first year of college.

It must be borne in mind that in the studies regarding school achievement, especially those made in the United States, the language situation is such that the student is in the process of losing one language—his vernacular, and of learning another—the dominant language. A truly bilingual situation where the two languages are on equal footing is not encountered. Fortunately one study exists, that reported by Professor Bovet (4), where the latter situation obtains. M. E. T. Logie, the director of a school in the Union of South Africa, by special permission from his government, conducted an experiment in his school as follows. The pupils in his school were given bilingual instruction, the same lesson being taught in Afrikaans, and then recited in English, or vice-versa; the same teacher taught the subject in both languages without favoring either one or the other. It was also seen to that the children in playing games were mixed rather than divided into linguistic groups. The affective as well as the purely language learning factors were therefore constant for the two language groups. After four years of this experience the children were tested as to their knowledge of the mother tongue and of the second language, both, also in arithmetic (this subject being selected as a test for logical thinking), and in geography. The results of these tests were compared with the results of the same tests taken by pupils in unilingual English and Afrikaans schools. On none of the tests were the bilinguals shown to be inferior to their unilingual contemporaries. This experiment, more crucial than any others, shows that bilingualism per se need not be a cause for school retardation even in the elementary school.

#### *E. Bilingualism in Relation to Speech and Other Motor Functions*

Blanton and Blanton (2) have had experience with many bad cases of stuttering which involved bilinguality. They do not claim, however, that bilinguality is the cause of stuttering. Travis, Johnson, and Shover (36) claim that the chances are 98 to 100 that the bilingual child will stutter more than the monoglot. However the percent of stuttering in



the population they examined was only 2.8% so the occurrence of it among the bilinguals could not have been very frequent.

Henss (40) reports the case of his own son, who grew up in Holland and used both of his hands equally well up to the fourth year, when he was sent to a German school. His language development in German was rapid. At this time he started a preference for the use of his right hand. Later, entering the German school again, he became right-handed. During this period he spoke an equal amount of German and Dutch, and began to stutter. This continued until he left Holland and forgot the Dutch language.

Saer, Smith, and Hughes (26) in Wales examined 679 bilingual and 281 monoglot children as to dextrality. The children were asked to show their right hand, left ear, or in a picture to show the right hand, ear and foot. In both urban and rural districts, reversals, confusions or hesitations were more frequent among the bilinguals than among the monoglots. Also 339 unselected children in an urban school were tested as to their sense of rhythm. The children were asked to tap and sing "la." The results were inconclusive for the tapping test, but in the "la-ing" test the monoglots were superior at each age from 7 to 12.

This entire field of the relation of bilingualism to speech or motor disorders remains unsatisfactorily investigated. The few studies reported seem to indicate certain difficulties, probably of an emotional nature, which may or may not be due to bilingualism. However, no definite conclusions can at present be deduced.

#### *F. Bilingualism in Relation to Personal and Social Adjustment*

In most bilingual situations the two languages involved do not carry equal social prestige; one of the languages is usually more dominant, carries greater social approval, is the representative of the "superior" culture. This situation obtains especially in countries of immigration and colonization. The question arises whether in such situations the bilingual person does not suffer from a sense of inferiority or inadequacy, whether or not he is socially frustrated, how well he is able to accept himself and his social group, how securely anchored he is in the two cultures represented by the two languages.

There are many speculative claims but little experimental evidence. A study by Darsie (7) using teachers' ratings as measures of pupil adjustment finds the Japanese children more stable emotionally than the American children in the same schools. Pintner and Arsenian (23) report zero correlation between degree of bilingualism as measured by the Hoffman Scale and school adjustment as measured by the Pupil Portraits Test. The population in this study consisted of 469 native-



born Jewish bilingual pupils of the 6th and 7th grades in a New York City public school.

The most noteworthy study in this field is that of Dr. Spoerl (31). She equated two groups of college freshmen on mental ability, age, sex and socio-economic status and then studied intensively the personal and social adjustments of the bilingual and the monoglot groups using a number of good measuring and analytical devices of adjustment. These were: the Allport-Vernon Study of Values, the Bogardus Test of Social Distance (modified), the Kent-Rosanoff Association Test (modified), the Bell Adjustment Inventory, and the Morgan-Murray Thematic Apperception Test. Her conclusion of this study (31, pp. 56-57) is worth quoting at length:

Our conclusion, then, is that the emotional maladjustment of the bilingual student, insofar as it expresses itself in terms of reactions to social frustration, and particularly in terms of family disharmony, is the result of the culture conflict to which the native-born children of immigrants are subjected. But this culture conflict is complicated by the bilingual environment. Thus it is that bilingualism enters into the situation, not in its intra-personal aspects, but rather as a symbol of one of the environmental factors converging upon the second generation. Most of the emotional maladjustment of the bilingual student is environmentally determined, and is not the result of mental conflict engendered by the complexities of thinking or speaking in two languages. This is true of the social maladjustment, the lack of harmony in the home situation, and the lack of identification with the present environment (coupled with a rejection of the cultural background of the parents), all of which tend to characterize college students who are bilingual.

One finding remains, however, which does not fit into this culture-conflict complex. That is the finding, primarily from the Association Test, of a significantly larger number of reactions on the part of bilingual students in terms of the *act of speech* to the word *language*; and in terms of the *act of understanding* to the word *understand*. These suggest that, although at the college level bilingualism, as such, is not affecting the students' expressive power (as evidenced by his control of English, his almost equal vocabulary, and his academic performance) there is in his mental organization a residual effect of the emotional turmoil and mental effort which must have been present in the early days of his school career when English was not, for him, a facile medium of expression.

The social psychology of bilingualism is most interesting as well as most important because of the following facts. Language is the medium of culture; in addition to being a code it is also a tradition; it embodies in itself the sufferings as well as the aspirations of a nation. As language represents one of the most potent forces of national existence, its encounter and struggle with another language calls forth an interplay of emotional forces which result in the pathos and drama of human life. Here we are dealing not merely with the acquisition of two languages in place of one, but with the complex psychological and sociological



phenomena of a culture conflict. The protagonists of a *neutral* international auxiliary language have here a strong argument in favor of their scheme. A neutral language, if such can be found, is devoid of tradition; it is a code, and imposes itself equally on all languages and cultures without invidious distinction. A living language, no matter which, necessarily brings with it a tradition foreign to other languages and cultures, unavoidably insinuates privilege and superiority of one group as against others, and creates social-psychological conflicts and barriers.

### *G. Learning a Second Language*

The problem of bilingualism raises the old question of the optimum time and method for the successful learning of a second language. Practice with regard to both time and method varies greatly from place to place.

Prior to the World War II, in the French possessions of Algeria, Cameroon and Togo, Morocco, Equatorial and West Africa, Syria, Lebanon, and Tunisia, French was the sole medium of instruction from the earliest grade on, and the vernaculars were disregarded, or in some places prohibited. In Indo-China the vernacular was used as the medium of instruction in the primary schools (ages 7 to 10) and French was offered as an optional subject. In Madagascar both French and Malagasy, the vernacular, were used interchangeably as media of instruction in all schools.

In the British possessions the practice is variable. In general, the vernaculars are used as the medium of instruction in the earlier grades and English is introduced gradually, first as a subject of study and later as a medium of instruction, on the secondary school level, as in India. In the Union of South Africa and in Ceylon one finds three distinct sets of schools: vernacular medium, English medium, and bilingual. Further variations are to be found in the Belgian Congo, the Dutch East Indies, in Palestine, Egypt, some European countries with large language minorities, and in the Soviet Union. In the western European countries and in the United States so-called foreign languages are included as subjects of study in the secondary school curriculum.

This great variation in the time as well as in the method (perhaps the more variable) of instruction is itself an indication of a lack of knowledge as to the optimum time and method for the study of a second language. Here is a challenge to educators and psychologists.

On the whole, our practices in the teaching of a second language seem to be based on the assumption that language-learning is a conscious reasoning process—an assumption that probably comes from the logicians and grammarians. It is time to question this assumption and to test its validation experimentally.



There is general agreement that the earlier the acquisition of a second language the stronger its impression upon the individual and the more effective its use by him. Judd (13, p. 137) says:

The person who acquires a second language late in life always finds himself handicapped. He is, in the first place, defective in pronunciation. The reason for this is that the sounds of his native tongue monopolize his habits of articulation. . . . On the other hand, a child can acquire two languages in early youth and make a complete success of both. The child is plastic in his habits.

Palmer, whose contributions to the method of language teaching are well known, writes (21, p. 40):

What evidence is afforded by bilingual children who have learned two languages simultaneously, children of mixed parentage, children whose care has been entrusted to foreign nurses, children who live abroad with their parents? In nearly all the cases of which we have any record it would appear that the two languages have been acquired simultaneously without mutual detriment; there has been practically no confusion between the two, and the one has had little influence on the other. Both have been acquired by the natural language—teaching forces.

In this connection mention should be made of the experimental school of language-learning in Madrid. Here children are taught the Spanish, English, German, and French languages from kindergarten on. On the basis of the experience of four years of this school Castillejo (6, pp. 9-10) reports: "So far, the children of ten and eleven years have been sent to take examinations in other schools, and this test has enabled us to verify that they are not in the least retarded compared with children of the same age, who have received twice the number of hours of teaching in the mother tongue."

The evidence from the studies of bilingualism points in the same direction. Bilingualism, that is, simultaneous learning of two languages from infancy, has no detrimental effect on a child's mental development provided the following conditions are observed:

1. That at the earliest stages of the child's language development a consistent method of source and presentation of the two languages is observed, i.e. *une personne, une langue*.
2. That psychological barriers or negative affective conditions, such as inferiority or superiority of the languages involved, or national and religious animosities sometimes associated with language are absent, and
3. That the languages are learned by spontaneous, informal or play methods, and not by formal and task methods.

Be it observed that we simply don't know the limits of children's achievements when appropriate methods of learning are practiced. It is certainly a tremendous advantage to any person, young or old, to know two languages, which make it possible for him to be in facile contact with his own immediate environment or cultural group, and also to go beyond the circumscribed boundaries of his native tongue and lay hold



2. Comparative study of existing languages; their similarities and differences as to roots, word formation, syntax, grammar, orthography. Possibility of a scale or scales for the measurement of relatedness of languages.

3. Geographical and statistical study of languages as to their spread and overlap.

4. Studies in connection with the simplification of existing languages, like Basic English, Basic Chinese, Modern Turkish (especially in orthography).

## II. *International Language*

1. Critical evaluation of the claims of the proposed international auxiliary languages.

2. Criteria for an international language (See the work to date of Iala-International Auxiliary Language Association).

3. What are the difficulties to be encountered in introducing an international auxiliary language? What are the forces for and against the introduction? Will such a language be for the masses or for the classes?

4. Can there be an international auxiliary language based on all languages of the world—a language which will be as fair for the Chinese as for the French child to learn?

## III. *Language Learning*

1. What is the optimum time for learning a second language?

2. What methods are most effective for the learning of a second language?

3. Is the learning of a second language an unsurmountable burden for the intellectually inferior child? What intellectual level of ability is necessary?

4. Does the learning of a second language facilitate the learning of a third? Any relationship between the languages involved?

5. Can adequate tests for language aptitude be constructed?

6. What is the psychological process of the acquisition of language by the child?

## IV. *Bilingualism*

1. A scale for the measurement of actual bilingualism in individuals and groups.

3. Developmental studies of bilingual children.

4. Comparison of monoglot and bilingual authors as to excellence in writing and clarity of thought.

5. Case and questionnaire studies of bilingual persons as to their language use, expression, difficulties, felt advantages.

6. Study of compositions of bilingual pupils as to clarity of thought, effectiveness of expression, language errors, introduction of peculiar expressions of one language into another.

7. Measurement of vocabularies of bilingual and unilingual children. Does the bilingual child catch up with the monoglot? At what age? Under what methods of teaching the languages? What is the extent and nature of the vocabulary handicap, if such there be?

8. Investigations of bilingualism and school achievement, especially along the pattern of Logie's experiment in the Union of South Africa.

9. Bilingualism in relation to speech disorders. Is bilingualism a causal factor? How involved?

10. Bilingualism and motor functions—handedness, rhythmic sense, balance, etc.

11. Is bilingualism a causal factor in personal maladjustment? Is a feeling of inadequacy or inferiority caused by bilingualism per se?



12. Is the language of the mother or the father (in mixed marriage families) more dominant with the child?

#### V. *The Social Psychology of Language and Bilingualism*

1. Is one language necessary for cultural cohesion or national solidarity?
2. How does language facilitate or inhibit cultural assimilation or accommodation.
3. What are the psychological barriers in social relations when people speak different languages? When both speak the same language, it being the mother tongue of one and a second language to the other?
4. What are the extent and nature of the emotional values of words and expressions in a language native to one and foreign to the other person?
5. In what kind of cultural juxtaposition do equilateral, competitive or superior-inferior feelings as to language show themselves?
6. In what way is the national character of such bilingual nations as Luxemburg, Switzerland, and Belgium different from that of a unilingual nation?
7. In what way do affective factors, such as social prestige, assumed superiority, or—contrariwise—assumed inferiority, or enforcement of a language by a hated nation affect language learning in a child.
8. How do victor and vanquished nations look at each other's language? Under what conditions may one learn the language of the other?

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# PSYCHOLOGY AND THE WAR

Edited by  
DONALD G. MARQUIS

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## PLAN FOR A HISTORY OF PSYCHOLOGICAL SERVICES IN THE WAR

ROBERT M. YERKES, Chairman  
*For the Committee*

The Division of Anthropology and Psychology, National Research Council, has appointed as a Committee on the History of Psychology and the War, Walter V. Bingham, Dael L. Wolfe, and Robert M. Yerkes, Chairman. With the approval of the Division the Committee presents the following plan of action.

*Definition of task.* To encourage the preparation of adequate materials of report by the agencies and individuals responsible for psychological work, and to prepare, for the profession and all concerned, a general and inclusive but brief and reasonably nontechnical account of what psychology and psychologists did to help win the war and the peace.

*Procurement of materials.* This plan, of course, presupposes the preparation and ordinarily also the publication of special, detailed, administrative and technical report on phases of psychological services by the various agencies (many of which are listed below), and also by individuals, responsible for the work. The over-all history which is projected should be thought of as supplementing any and all such special reports



of the military and other agencies and not as in any sense taking their place. It is a function of the Committee to confer with appropriate administrative officers of the various agencies concerning the significance of records and planned historical reports, to enlist their interest and cooperation, and to seek their assurance that as of the end of the war, or earlier if feasible, report on the psychological functions of the agency shall be made available to this Committee. Furthermore, each agency or field of service has been requested to designate one or more representatives, preferably specialists in psychology, to act as consultants to the Committee. The several individuals thus designated constitute a Board of Consultants as adjunct to the Committee.

*Information sought.* The Committee desires information on a wide variety of psycholgyical-military activities, examples of which are to be found in mobilization, individual appraisal, classification, training, communication, espionage, propaganda, morale and incentives, counseling, problems in the design of weapons and other instrumentalities of warfare, etc.

The history of administration and organization is not the responsibility of this Committee. It is assumed that such reports are in preparation, or will be written by the agencies. The Committee needs authoritative information concerning (1) the requirement, need, or problem for the solution or satisfaction of which psychological techniques and psychologists have been employed; (2) the ways and means (procedures, techniques, adaptations, new inventions and developments) used in problem solution; (3) the practical values of the service as measured by objective data or indicated by approval, acceptance and adoption by military or other authorities concerned.

*Preparation of manuscript.* The Committee accepts no responsibility for editing or publishing the comprehensive historical accounts of services, but it will be responsible for the analysis of material obtained from the various source-agencies, for selection therefrom, for the development of a plan of presentation of the over-all general report and the preparation of a manuscript for press. Committeeman Dael L. Wolfe has agreed, circumstances at the unpredictable date of action permitting, to function as author of the volume. He will have the editorial assistance of his fellow committeemen.

*Publication and distribution.* It is proposed that this historical report be planned and written for issuance by a commercial publisher. Royalties, or other returns from the publication, shall be payable to the National Research Council, to be used for the support of psychological projects, or to reimburse any agency which may have advanced funds for the preparation of the manuscript.



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# MILITARY PSYCHOLOGY IN THE ARMORED SCHOOL

MILTON B. JENSEN, JULIAN B. ROTTER, AND ROSS HARRISON

*The Armored School, Fort Knox, Kentucky*

The Office of the Personnel Consultant of the Armored School was formed in September 1942 by Major Milton B. Jensen at the direction of Major General Stephen G. Henry, Commandant, with the function of providing a variety of psychological services. The office was established as a result of interest shown by the Commandant following a series of lectures given at Fort Knox by the senior author while still in a civilian capacity. The name of this section was changed in 1944 to the Military Psychology Section without involving any change in function. This report concerns the activities of this Section during the period September 1942 to September 1944.

In addition to the authors, who are experienced psychologists with the doctorate, professional personnel during that period included Richard S. Ball (M.A. in psychology), S. Sanford Dubin (M.A. in psychology), and Ruth C. Brewer (M.S. in social work). The number of personnel varied from three at the inception of the office to eight in the spring of 1944, including clerical and stenographic assistants.

During the two year period the department performed a variety of functions which will be outlined under the headings of Research, Clinical, Educational and Advisory.

## I. RESEARCH

Most research activities were coordinated with other functions and were undertaken with immediate applications in mind. In terms of time and emphasis research studies played a prominent role in the activities of the office. Major research projects are described below.

*Analysis of AWOL.* A continuous analysis of men who had absented themselves without authority was made over the two year period. This analysis sought out the sources and concomitants of AWOL. The psychological characteristics and background of soldiers who had gone AWOL were examined in considerable detail. In addition the different methods of punishment and control were investigated. On the basis of these studies reports and recommendations were made which when acted upon helped bring about a sharp reduction in AWOL in the Armored School.

*Selection of officer candidates.* A study of the selection of officer candidates for the Armored Officer Candidate School was begun in the summer of 1943. A large battery of ability and personality tests was administered to a group of "truly excellent" officers between ages 20 and 30 inclusive and to the 1,500 officer candidates in nineteen consecu-



tive classes. The purpose was to develop techniques which could be used in the initial selection of officer candidates for the Armored School and to eliminate potential failures early in the course. From these studies it was found that academic success or failure could be predicted with unusual accuracy from an ability test battery which included the Wonderlic Personnel test and the New Stanford Advanced Reading Comprehension, Word Meaning, and Arithmetic Computation. The extent to which personality factors were significant in success or failure in Armored Officer Candidate School was also evaluated. During the course of this research some of the personality tests coming into recent use were studied. As a bi-product of these studies it was found that the Multiple Choice Rorschach test was invalid as a screening device for officer candidates and that adequate interpersonal reliability could be obtained with a Group Thematic Apperception test.

*Selection of radio operators.* Various tests were administered to failing and definitely superior students in the radio operators course as an exploratory study of selective techniques. The two groups were reliably differentiated by the Army Radio Operators Aptitude test (ROA), selected items from a health complaint inventory, a letter-symbol substitution test, and on the basis of age. The discriminative power of these measures dropped when the total distribution of all student operators was compared with a pass or fail criterion. When the entire distribution was compared with this criterion, reliable selectivity was obtained only with the ROA administered at the Armored School but not with the same test given earlier at Army Reception Centers.

*Minor studies.* An analysis of personality factors in cold adaptation was made on a limited number of subjects at the request of the Armored Medical Research Laboratory. Other studies included an investigation of the attitudes and potential value of limited service men and an analysis of the psychosomatic and nervous complaints of 500 overseas returnees.

## II. CLINICAL

The clinical work was broad in scope, combining some of the functions of a mental hygiene clinic, a psycho-educational clinic, and a court psychologist. Whenever officers or enlisted personnel were referred to the Military Psychologist for evaluation, reports containing a summary of findings and recommendations were sent to the Commandant and all officers concerned with disposition. In addition conferences were frequently arranged with commanding officers.

*Sources and reasons for referral.* The principal sources for referrals were the company commanders and the various departments of the School. Soldiers who had been AWOL or committed other violations of the Articles of War considered serious enough to warrant trial by



court martial were first sent for psychological examination to determine whether they were responsible for their behavior before disciplinary action was taken. These referrals were usually by company commanders who, sometimes in the light of psychological findings, withheld court martial proceedings in favor of psychiatric disposition. Ordinarily court martials were halted only for soldiers with severe psychopathology. Officer candidates were sometimes sent by the Director of Armored Officer Candidate School for evaluation if there were doubt as to their emotional stability. In order to relieve some of the pressure of cases on the inadequately staffed Neuropsychiatric Section of the Station Hospital, arrangements were made so that psychiatric problems from the dispensaries were seen by the Military Psychologist before admission to the hospital. In this way the Military Psychology Office has acted as a virtual out-patient department for the hospital in a consultant role. Parenthetically, it may be said that the working relations with the psychiatrists were harmonious; the psychological and psychiatric services were coordinated without any clash of professional jealousies.

The referrals were problem soldiers in general, but certain types of cases were prevalent.

Students doing poorly in the various courses given in the Armored School came for both educational prognosis based on test results and for determination of emotional balance, since many of the school failures could be attributed to affective disturbances. AWOLs and other court martial problems were not only evaluated for degree of responsibility, but the offense was studied in relation to the personality of the offender. The dispensaries referred psychoneurotics with psychosomatic conditions for aid in formulating judgments as to the relative importance of the psychic and somatic components in the disorder. Company commanders and department heads referred a large number of enlisted men for nervous manifestations, queer behavior, and upset emotional states. Others were sent because they either represented refractory discipline problems or there was some question as to their suitability for military service. Another smaller group consisted of officers who appeared at the clinic either on their own referral or because they had been referred by superior officers for examination and recommendation regarding emotional disturbances, misconduct, or inefficiency. An "off the record" consultation service to officers and their families constituted a small but significant function of the Section.

The clinical types most frequently encountered were psychoneurotics, social psychopaths, and mental defectives. Psychotics were rare, and many subjects were only mildly unstable or were essentially normal but in situational difficulties.

*Methods of evaluation.* The procedures employed varied with the requirements of the individual problem, but in all the basic tool was the interview by the psychologist which covered schooling, family life, jobs, psychosexual adjustment, social and recreational activities, atti-



tude to religion, history of illness, and an account of the subject's current perplexities. Before the interview clerical assistants transcribed to the Personal Interview Form such information from official records as Army test scores (AGCT, MA, CA, ROA), physical status, and civilian and military background including education, assignments, organizations, punishments, promotions and reductions in grade. Reports of Red Cross and civilian police investigations, physical and psychiatric examinations, and of Hospital Disposition Boards occasionally were available.

The amount of testing was adapted to the needs of each case. For estimating general intelligence chief reliance was placed on the Wechsler-Bellevue with the Wonderlic Personnel, Kent-Shakow Industrial Formboard Series, and the Kent-Kohs Blocks as auxiliary measures. In testing intellectual impairment or deterioration for patients with head injury or suspected psychosis, the Shipley-Hartford Retreat Scale, an intra-test analysis of the Wechsler-Bellevue, and tests of form perception were used. In the personality field the Psychasthenia Inventory of the Minnesota Multi-phasic and a specially devised inventory for the evaluation of physical complaints and hypochondrical trends were routinely administered before the interview to literate subjects, while several other questionnaires like the Thurstone Vocational Interest Schedule, McFarland-Seitz P-S Experience, and the Terman-Miles M-F test were occasionally given. The evaluation of personality questionnaires as well as of all other psychometric data was along clinical lines in terms of the total personality pattern as revealed by all modes of investigation rather than by literal acceptance of numerical scores. The most valuable technique for probing covert material in persons who could not be trusted in direct interrogation was the Thematic Apperception test. A number of other tests were administered on occasion, including the Rorschach.

*Disposition.* The possibilities for treatment and disposition included psychotherapy, Red Cross investigations, recommendations regarding punishment, disqualification for overseas combat duty, discharge from the Army, conferences with officers for counsel in handling problem soldiers, recommendations for transfer to combat training organizations and other units, change of assignment within the School, relief from courses, and other environmental manipulations. The position of the psychologist however was primarily advisory, seldom command, in function; his recommendations were usually but not always followed.

A large number of referrals showed neurotic trends in varying degrees, particularly dispensary patients with physical complaints. Psychotherapy was the method of choice but, except in a few cases of extended treatment, was necessarily limited, since psychological examination of from four to eight subjects daily in addition to other activities was not uncommon. Roughly 1,000 problem soldiers were examined and reported upon in writing during the two year period. With mildly unstable individuals and chronic discipline problems, the emphasis was less on trying to achieve drastic changes in personality structure and more on readjusting attitudes in the direction of greater identification



with the war effort and less concern with self, so that these men could function more effectively as soldiers. Severely neurotic enlisted men were disqualified for overseas combat duty, while others with such serious derangements as psychotic and acute anxiety states were referred immediately to the Neuro-psychiatric Ward of the Station Hospital.

When patients appeared likely to suffer complete mental disorganization if kept in service or if the risk of suicide seemed great, discharge for psychological reasons according to the provisions of Army Regulations was recommended. The usual procedure with homosexuals was likewise to recommend discharge, since there was little chance of rehabilitation within the Army; instead the enforced close association with other men exacerbated the homosexual trend. When an enlisted man had homosexual guilt conflict, there was the danger of suicide or functional breakdown; with confirmed invert of long standing, the danger of contagion was great. In discovering sexual aberrations both lie detection technique and the Thematic Apperception test proved invaluable. Whether men mentally defective in the psychometric sense were discharged or retained was determined by the degree of retardation, the amount of emotional control, and their value as soldiers on simple labor assignments. The disqualification and discharge functions were positive to the extent that men unfit for military duty (a) tax the administrative and service facilities of the Army, (b) constitute hazards to other soldiers whether on garrison or combat assignments, and (c) are more likely to become wards of the state if continued in military service.

For those who had committed military offenses punishment followed as a matter of course if they were found responsible for their behavior; when there were mitigating circumstances such as marked emotional instability, mental retardation, or extreme environmental pressures, these data were reported to the company commanders and to the Judge Advocate General's Department. A few who were so highly unstable that they could probably not endure stockade confinement without mental breakdown were recommended for discharge.

With failing students and officer candidates the question was usually one of retention or relief from school after either educational diagnosis by test methods or judgment regarding neurotic tendencies following examination. The cases of officers were special problems in diplomacy; disposition usually involved therapeutic conversations and consultation with the referring officer.

*Special clinical services.* A unique function of military psychology in the Armored School was the examination of approximately 200 cases for lie detection with a psychogalvanometer and occasionally with a sphygmomanometer added. The men were referred not only by company commanders within the School but also by the Criminal Investigation Office of the Post Provost Marshal. The purpose was the determination of the truth or falsity of statements made by witnesses or enlisted men charged with such offenses as theft, cheating in examinations, violations of security, black market activity, and accidents caused by irresponsible behavior.

As part of the research on officer candidate selection, 1,500 candidates were examined with a battery of ability and personality tests. Detailed reports which contained scores, academic predictions, and rat-



ings on ability and personality suitability were made to the Director of the Armored Officer Candidate School. The test battery, usually somewhat modified, was also administered to 150 applicants for warrant officer or Officer Candidate School, and reports were submitted to the examining board.

Since the spring of 1944 approximately 1,000 overseas returnees and other new men transferred to the Armored School were examined in order to eliminate soldiers with severe neurosis from assignments within the School. The screening of unsuitable personnel was carried out by group testing with the psychasthenic and health inventories and by brief interviews. Those with high scores or other suggestions of unhealthy trends were then interviewed more carefully. Returnees with physical complaints were sent to medical officers for physical examination. Suggestions regarding individual assignments were made to the Classification Officer in certain instances.

Other miscellaneous clinical services were rendered from time to time; e.g. when men were to be chosen among illiterate and barely literate soldiers for special reading training, all were given non-language and elementary reading tests in order to discover those who had sufficient ability to profit from instruction.

### III. EDUCATIONAL AND ADVISORY

Personnel of the Military Psychology Section lectured regularly to commissioned and non-commissioned officers. Mimeographed publications were distributed to all units and officers of the Armored School and to all who attended the lectures. Lectures given included:

1. A lecture on "The Psychology of Fear" for all student officers and to all officer candidates. This lecture grew out of a directive from the Commandant that men be prepared psychologically for simulated combat conditions.
2. A series of lectures for company non-commissioned officers on morale, adjustment, and the handling of other men.
3. Lectures on the nature and effects of frustration for all assigned officers.
4. Lectures to assigned officers on procedures for discharge of enlisted men for psychological reasons.
5. Lectures on personal adjustment for assigned officers.

Publications were written as accompanying material for lectures and also as an additional source of information. Those mimeographed for general distribution to assigned officers were:

1. *The Psychology of Fear*. A description of the nature and control of fear and facts concerning psychological casualties of war.
2. *The Problem Soldier: Kinds of Maladjustment*. A description of different kinds of maladjustment as they relate to the military with suggestions to commissioned and non-commissioned officers for handling such problems.



3. *The Problem Soldier: Case Studies.* Illustrative case studies were cited describing typical examples of the kinds of problems mentioned in the previous report with an account of their disposition or treatment.

4. *An Analysis of Personality Characteristics of AWOL Prisoners.* An analysis of race, background, psychological characteristics, and clinical types for 103 AWOL prisoners, showing the main causes for AWOL in the Armored School.

5. *Social and Military History of the Chronic AWOL.* A comparison of 83 AWOL recidivists with 83 matched cases of the same rank and approximate duration of service who had never been AWOL.

6. *Summary of AWOL for 1943.* A presentation of the frequency and main sources of AWOL. Monthly summaries were also circulated.

7. *Meeting Frustrations in the Army.* A description of the main frustrations the civilian who enters the Army meets at early and later stages of his training and methods of lessening such frustrations.

The Military Psychologist frequently acted in an advisory capacity to the Commandant or other officers in the School. On the basis of brief investigations, psychological principles, and military experience suggestions were made regarding problems facing the officer or agency making the request. The nature of much of this counsel cannot be divulged for security reasons. Some of the problems on which the psychologist was consulted are given below:

1. Investigation of complaints regarding prison conditions.
2. Methods of teacher training.
3. Critical evaluation of a training manual to be used with Battle Inoculation Training.
4. Daily schedules of activities and work periods for all students.
5. Training procedures for tank driving instructors.
6. Length of training sessions for Radio Operators Course.
7. Policy for punishment of military offenses.
8. Policy for discharge of enlisted men for psychological reasons.
9. Furlough and pass policies.
10. Vice control in nearby cities and control of venereal disease.
11. Methods of handling and using overseas returnees.
12. Extent and nature of recreational activities.
13. Utilization of men inducted on a limited service status.

This article has been designed to illustrate the wide range of applications of psychological techniques possible in a military garrison setting. Utilization of psychological services at the Armored School during this critical war period was a product of the combined efforts of School Command, medical officers, officers, and non-commissioned officers concerned directly with the men themselves.



# THE VALIDITY OF CERTAIN MEASURES OF MALADJUSTMENT IN AN ARMY SPECIAL TRAINING CENTER\*

WILLIAM D. ALTUS, 1ST LT., AND  
A.G.D.†

*NSC Special Training Center,  
Camp McQuaide, California*

HUGH M. BELL, 1ST LT.,  
A.G.D.†

*Classification and Counseling Section,  
Adjutant General's Office  
Washington, D. C.*

The large number of measures of maladjustment, or personality tests as they are commonly called, which have been developed since the first World War is tacit admission of the importance of factors in personality to success in living and to adequate personal adjustment. Some of the tests which have been developed have lacked both validity and reliability; some have a high reliability but it has sometimes not been easy to determine exactly what was being measured in so reliable a fashion. It would be difficult to find many which have proved useful in the psychological clinic.

The psychologist in Army installations often needs a measure of personal factors other than those of verbal or quantitative aptitude. Aptitude tests are available in comparative abundance and some have a relatively high degree of validity, but paper and pencil tests which will forecast the adjustment of the newly inducted soldier to the Army are not at hand. Even if such tests were available, they could not be used with the Army personnel assigned to a Special Training Unit (1) because of the inability of the men to read. What was needed was an oral test of adjustment, which of necessity must be short because of the number of soldiers to be interviewed.

Consequently, a tentative selection was made of the 23 most valid (2) items of the original 140-item *Bell Adjustment Inventory, Student Form*, which purports to measure home, health, social, and emotional adjustment. Subsequent item analysis showed all of the items to possess marked discriminating power for this special group of soldiers, just as they had in the original standardization—that is, all except one item “Do you love your mother more than you do your father?” This item was discarded. The validity of the 22 items remaining was subjected to further analysis by correlating the number of maladjusted responses in an individual interview against the number of times the soldier was returned to duty by the medical officers after he had re-

\* The following article represents the opinions of the authors only and is not to be construed as representing the official opinion of the Army of the United States.

† The authors were assisted by the following staff members of the Center: 2d Lts. Harry Offenbach, Ephraim Yohannan and Jerry Clark; T/4 Roy Burge, T/4 Robert Ewart T/4 Earl Diffenderfer, T/Sgt. Clarence Mahler, T/4 James Taylor.



ported himself sick and nothing was found wrong with him. Only two health items were included among the 22. It was surprising, therefore, to find that the test correlated almost as well with the incidence of "riding the sick book" as did the Hypochondria subtest of the Minnesota Multiphasic Personality Inventory (3) which was a part of the battery of tests used at the center. This latter test had been introduced in the program as a specific measure of hypochondria in order to pick out those maladjusted individuals who continuously complained of ailments which no medical therapy diagnosed or alleviated.

The validity coefficients of the two tests were  $.34 \pm .042$  for the 22 items and  $.370 \pm .079$  for the Hypochondria section of the Minnesota Multiphasic Personality Inventory—hypochondria being used as the criterion.

It appeared desirable to include two other measures of maladjustment. One, a tendency toward paranoia, for it was believed that military life, with its necessary regimentation and authoritarian discipline, would bring to full flower any latent paranoid tendencies. For this purpose, the Paranoia subtest of the Minnesota Multiphasic was employed. The other measure, which was locally constructed, was adjustment to the Army, *per se*. Included in this test of Army Adjustment were questions concerning one's liking for Army food, one's feeling about his treatment by non-commissioned officers, his attitude toward his loss of privacy in sleeping, eating and washing, and his attitude of like or dislike toward the other soldiers in the camp.

These four tests of maladjustment—the reduced Bell Adjustment, Army Adjustment, the Minnesota Paranoia subtest, and the Minnesota Hypochondria subtest—were given as an adjunct to the group tests used in placing the soldiers in the Special Training Center and the vocabulary, general information and Army Wechsler Intelligence tests, which were individually administered.

After repeated item analyses during the months of September and October, 1943, the Paranoia and Hypochondria subtests of the Minnesota Multiphasic were so reduced in size and so changed by re-wording that they no longer bore any resemblance to the original tests. The same process was used with the Army Adjustment test; after each weeding out process through item analysis, more items were added until finally the test consisted of 25 quite valid items, as compared with the original 15 which the test initially contained. None of the Bell items was changed after dropping the one previously mentioned, for all the items stood up quite well on all subsequent item analyses.

The chief function of the Special Training Center is that of bringing its trainees to a level of literacy which is roughly that of the fourth grade, during a training period which cannot exceed sixteen weeks.



Very low verbal aptitude, language difficulty (over one-fourth of the trainees are of Mexican descent), and almost complete illiteracy on arrival prevented a number of the men from reaching graduation level within the time limits imposed by Army regulation. The men who could not complete the course of training successfully within the specified time limits were discharged from the service.

A preliminary study, made in November, 1943, showed that the trainees discharged had significantly lower averages on all the individually administered aptitude tests and on all the group tests than did the trainees who were graduated and shipped. This finding is, of course, to be expected. Somewhat unexpected, however, was the finding that the discharged trainees also had higher average scores on all four measures of maladjustment then in use. These findings were regarded at the time as promising but inconclusive, partly because the number of cases involved was relatively small and partly by inference from past studies of tests of maladjustment with scholastic success, which have failed to show any significant relationship.

By May, 1944, it was possible to make a check on the association of the four tests of maladjustment with the tendency of trainees to graduate from the Center or to be discharged for inaptness. All of the men received from Nov. 3, 1943 through Dec. 7, 1943, inclusive, had been disposed of and their personnel cards filed for study.

It was decided to lump all of the maladjusted answers on the four tests together, to comprise a single score. There were 87 possible maladjusted responses among the four tests; the highest total for any trainee was 68. A few trainees scored zero on the total scale. The average number of maladjusted answers to the 87 questions was, however, 22.63 for the total group, those being discharged for inaptness and those graduating.

The mean maladjustment score for graduates of the Center was 17.72; for those who were discharged for inaptness the mean was 31.82. The difference between the means, it will be noted, is 14.1. The difference between the means of the groups divided by the standard deviation of the difference yields a critical ratio of 8.49. It is thus obvious that the difference in average number of maladjusted responses between the two groups is not due to chance factors.

Desire to know the exact quantitative relationship between the tests of maladjustment and the tendency to attain, or fall short of the graduation standards prompted the next step, the computation of a bi-serial correlation. The bi-serial coefficient between total maladjusted responses and tendency to graduate or to obtain inaptness discharges proved to be .453 with a probable error of .028. This relationship bears out the implication of the large critical ratio of the difference between the means of the two groups. However, there remained the possibility that the relationship so far educed might be due to an artifact. Thus,



the relationship would be proved a factitious one if it could be shown that there was a sizable relationship between maladjustment, insofar as these tests were measures of maladjustment, and verbal intelligence or degree of literacy of the trainees on arrival.

The linear correlation (Pearson product-moment) between total maladjusted responses on the four tests and Army Wechsler Intelligence Quotient was .152 with a probable error of .028, the  $r$  in this instance meaning that there was a slight tendency for the better adjusted to have a somewhat higher mental level than did the poorly adjusted. It will be noted that the probable error is small enough to make the  $r$  of .152 significant. It may be of interest to mention that the bi-serial correlation of the Wechsler mental levels with tendency to graduate as opposed to obtaining a discharge is .521 with a P. E. of .013. There is little to choose between a general aptitude test and a test of maladjustment in this instance; together they make a good battery since their intercorrelation is so small.

The highest bi-serial relationship of any of the test variables employed, when correlated with graduation and discharge for inaptness, was .794, P. E. of .017. This  $r$  was found true of the combination of two paper and pencil tests employed for placing the trainees in their proper level for instructional purposes. The Pearson product-moment correlation of the combined placement tests and the total maladjusted responses on the four tests of maladjustment was .108 with a P. E. of .028, the more literate trainees tending to obtain somewhat lower maladjustment scores. This  $r$  probably represents a true relationship, in view of the Wechsler mental level-total maladjustment correlation, though the P. E. is a bit too large to establish this inference beyond all statistical doubt.

The linear correlation of the Wechsler mental levels and the combination of the two placement tests was .43, P. E. of .035. It is apparent that the much lower intercorrelation of the maladjustment tests with the two placement tests, combined, makes this combination more valuable for predictive purposes than would be true of the Wechsler mental level and two-placement-test combination.

The statistical evidence of the preceding paragraphs corroborates the strong impression of those who used the tests of maladjustment that these tests were clinically very valuable in predicting the success of the trainees in the school. It is the hope of all who construct tests that their measures will all correlate highly with the criterion but will not correlate so well with each other. This hope seldom is realized, though it seems to have been to a moderate degree with the tests under consideration.

There is some evidence that the tests of maladjustment were most



## A MALINGERING KEY FOR MENTAL TESTS\*

HARRY GOLDSTEIN, 1ST LT., A.G.D.†

*Mental deficiency is frequently feigned, especially by illiterates. . . . For a disorder to be classed as true malingering, it must fulfill three conditions that—(1) No obvious or frank disease or personality disorder is present; (2) The individual is consciously aware of what he is doing and of the motive responsible for his attitude; (3) He is fixed in carrying out a purpose to a preconceived result. . . . Whenever it appears to an examining physician that an individual is endeavoring to escape service by malingering, if otherwise mentally and physically fit, he will be accepted.* War Department Mobilization Regulations 1-9, 19 April, 1944, Section XXIV, "Malingering," paragraphs 104-112.

Malingering on mental tests, a form of behavior encountered at induction stations and other military installations, may be defined as the feigning of mental inaptitude in order to avoid duty. Contrary to customary testing practice, the motivation operates in the direction of producing failing rather than passing scores. Consequently, the detection of purposely inferior performance poses a problem for the psychologist.

In a broader sense, the detection of sub-typical performance, whether deliberately produced or not, is a matter of concern to the psychologist. The use of tests as selective media is based upon the implicit assumption that obtained scores represent true or typical levels of performance. Since malingering is only one of many factors which may produce sub-typical performance, the crucial question, from the practical military viewpoint, concerns simply the trueness of the test score as an indication of test ability. Of course, the validity of the test as a measure of military aptitude is presupposed by its very use.

At the induction station, the usual method of detecting malingering is to interview each selectee who fails the examination and to check for discrepancies or inconsistencies between his test score and his educational and occupational history, general demeanor, language-expression, etc. In addition, the reasons for particular answers on the examination may be sought and evaluated.

The purpose of this paper is to introduce a malingering key, an objective instrument designed to expose sub-typical performance on mental tests. Although especially devised for the Army's Visual Classification Test, the methods which were originated in its construction are applicable to psychological tests in general. Essentially, the key is a

\* The opinions expressed in this article are those of the author and are not to be construed as reflecting the official attitude of the Army of the United States.

† On leave from the College of the City of New York.



scale composed of those items which proved most sensitive in differentiating between simulated malingering and genuine failing performance. Applied directly to the original test papers, and therefore requiring no additional testing, the key yields a malingering score based upon the number of *discriminating easy items failed and difficult items passed*. A critical score, established at the point of maximum differentiation between failures and malingerers, serves as the diagnostic criterion.

Properly used, the key enables the examiner to make more efficient use of his time and to do a more effective job. At the same time, it should increase his confidence in the accuracy of his decisions. A description of the methods used in the construction of the malingering key; statistics on its reliability and validity; and its proper use and interpretation constitute the scope of this paper.

### BASIC HYPOTHESIS AND ASSUMPTIONS

The research underlying the construction of the malingering key was predicated upon the hypothesis that morons and malingerers give characteristic, empirically differentiable patterns of test performance. This hypothesis was in turn based upon the following assumptions:

1. that the bonafide failure will tend to pass most of the items which are passed by a majority of the failing group and will tend to fail most of the items which are failed by a majority of the failing group;
2. that the malingerer will tend to fail more of the easy items and pass more of the difficult items than the bonafide failure will,\* and
3. that the malingerer will, therefore, approach the performance of a good group more closely on the hard items, whereas the bonafide failure will approach the performance of a good group more closely on the easy items.

The foregoing hypothesis and assumptions were experimentally substantiated in the present investigation.

*Operational premises.* In order to test the basic hypothesis, the three assumptions were converted into operational premises, which, applied independently and in various combinations to the data obtained from the experimental groups, provided the statistics for deriving different scoring keys. The keys were compared and evaluated and the best one finally selected. The three operational premises, serving as criteria for the inclusion of items in the malingering scoring key, are given below:

*Premise 1.* The greater the percentage of the failure group passing an easy item, the better the item; conversely, the greater the percentage of the failure group failing a hard item, the better the item.

*Premise 2.* The greater the percentage of the failure group passing an easy item, plus the greater the percentage of the malingerer group failing it, the better the item; conversely, the greater the percentage of the failure group failing a hard item plus the greater the percentage of the malingering group passing it, the better the item.

\* An accurate subjective appraisal of the ease or difficulty of test items is a hazardous task even for test experts, certainly so for inexperienced selectees.



*Premise 3.* The greater the difference between the failure and the malingerer groups and the less the difference between the failure and the good groups on an easy item, the better the item; conversely, the greater the difference between the failure and the good groups and the less the difference between the malingerer and the good groups on a hard item, the better the item.

Item difficulty was determined on the basis of performance of a failing group. The setting up of standards for the actual selection of items in the application of the operational premises was more or less of a subjective, arbitrary procedure aimed at getting the most sensitive items without sacrificing too many of them. Twelve keys, which appeared promising, were constructed, two of these being obtained by the application of a very simple weighting system. With further analysis and treatment along the lines described in this paper, better keys might have emerged; but the high percentage of success obtained in the identification of failures and malingerers suggested relatively little room for improvement.

### EXPERIMENTAL PROCEDURES

*Experimental groups.* Three groups, each consisting of fifty selectees, were utilized in the experiment; (1) a good group, which passed the examination; (2) a failure group, which failed the examination, and (3) a malingerer group. The good and failure groups were built up on the basis of past testings, the available papers being selectively sampled so as to be representative of their respective populations. The malingerer group was selected from among the men who are customarily examined by the psychology department, and was then subjected to the experimental conditions of simulated malingering.

Present practice calls for the administration of a verbal intelligence measure, the Mental Qualification Test, to all men who are not high school graduates. It is assumed that those who pass this test are mentally capable of performing useful military service. All men who fail the test are required to take a non-language intelligence test, the Visual Classification Test.

In order to ensure the exclusion of those men who might not really be capable of passing the Visual Classification Test, only those men were included in the malingerer group who showed their ability to pass the Mental Qualification Test with a score at least three points above the minimum passing score.

*The Visual Classification Test.\** Since the malingering scoring key was constructed for the Visual Classification Test 1-a, some brief description of this instrument is apropos.

\* The Visual Classification Test has been superseded by the Group Target Test, which differs from the former in that it calls for a *projective* type of response. This allows an additional approach to the construction of a malingering key and will be reported upon subsequently.



The Visual Classification Test is a non-language test of mental ability . . . composed of pictorial items whose solution is entirely independent of language skills. The items cover a wide range of difficulty but emphasize the lower end of that range. The directions involve a minimum of language so that inability to read or speak English will not handicap a man who is otherwise capable of performing many useful jobs.\*

The Visual Classification Test is a multiple-choice paper and pencil examination containing fifty items. It should be noted that the time limit of fifteen minutes is very liberal, allowing completion of the examination in almost all cases. To all intents and purposes, therefore, the test operates primarily as a power test.

*Procedure.* In view of the variety of approaches that might be used by true malingerers, it was deemed desirable to avoid the inculcation of any special mind-set. The subjects of the malingerer group were therefore asked to assume the mind-set of the malingerer as they conceived it, and to try to fail the examination accordingly. The following statement was made to the malingerer group:

All the men in this group did a fine job on the first examination (Mental Qualification Test). That is why you have been selected. The Army wants your cooperation in a little experiment.

Some people believe that if they fail our examination, they will be turned down by the Army. Make believe that you are one of those men and that you want to try to stay out of the Army.

You are going to be given a special examination and the idea is for you to try to fail the examination, and to fail it in the same way that you would if you were really trying to evade Army service.

Remember, this is purely an experiment, and will not determine your acceptance or rejection. At the same time, this is an Army project and your full cooperation is requested.

The group was then informed that the test would be administered exactly as usual, in order for the men to know how the test is ordinarily given. After the sample items were demonstrated, the following statement was made:

Don't forget, you are not supposed to pass the test; you are supposed to fail it—but in such a way that no one can catch on to you. Now, you figure out how you can best do that, and go ahead. I might add that what we are asking you to do is not as easy as it may seem. You will have exactly fifteen minutes to take the test. Begin now.

Excellent rapport was established. One member of the group desired to know what constituted the passing mark, but was informed that the men who really try to fail do not possess that information.

At the completion of the test, inquiry revealed that many subjects had tried to pass the examination (some unsuccessfully) and that many more had attempted to fail all of the items. Very few appeared to have comprehended the task. Therefore, the experiment was repeated. It

\* TM 12-260 Personnel Classification Tests, War Department, 1942, p. 24.



was pointed out that those who had tried to pass the examination had misconstrued the intent of the experiment; and that those who had failed every item would have been detected instantly. The purpose of the experiment was reiterated and the test repeated. The data from this second test were utilized in constructing the malingering scoring keys. The papers for the men who had tried unsuccessfully to pass the examination were discarded, leaving fifty papers in all.

In a sense, the experimental malingerer group had an advantage over the true malingerer. The fifteen minute time limit to the test does not allow the malingerer to evaluate each item too carefully; whereas, in the present experiment, the familiarity with items engendered by the first administration may have aided in their evaluation.

It was found that the data derived from the use of the second operational premise, described previously, yielded the best results. Since the procedures which were utilized, based upon this premise, are equally applicable to other tests, the steps in the process of scale construction are listed below:

1. A representative sampling of failing papers is obtained.
2. A group of non-high school graduates is requested to "malingering" on the examination. The ability of the individuals to pass the examination should first be established by pre-test. Many individuals will be found to pass the test when they are supposed to "malingering"; their papers should be discarded.
3. For each individual the correct items are entered upon item analysis sheets.
4. The percentage of failures and malingerers passing each item is determined; and the raw difference in percentages is recorded.
5. The items which are passed by more failures than malingerers are considered the easy items; those which are passed by more malingerers than failures are considered the hard items. The percentage differences (as recorded in step 4) may be indicated as plus and minus for the easy and hard items, respectively.
6. Those items showing the greatest percentage differences are incorporated into a key, and may be weighted in accordance with the size of the difference. Obviously, a great many keys may be constructed, depending upon the strictness of the standards used in the selection of items and the determination of weights assigned to each item.
7. Each key is then applied to the item analysis sheets and the distributions of malingering scores for failures and malingerers are compared. The critical score is set at the point which allows the least amount of overlapping between the failure and malingerer groups.
8. The percentages of correct identifications of failures and of malingerers are compared for each key. That key which allows the least percentage of malingerers to escape, and subjects the least percentage of presumably genuine failures to suspicion is the best key.
9. This key may then be refined by applying it to the overlapping individuals in the failure and malingerer groups, and altering the weights of the items in accordance with their ability to differentiate in the proper direction between these overlapping or "critical" groups.



10. This refined key is then applied to all the cases and the results are compared against the old key.

11. The key is then applied to an entirely new group of experimental malingerers and bonafide failures and its effectiveness noted. It is now ready to be applied in the field.

### THE RESULTS

The difference in the distribution of raw test scores of the failure and malingerer groups was so apparent that refined statistical analysis was really unnecessary. Nevertheless, the test scores of the fifty experimental malingerers were compared with those of a sampling of 268 failures, with the results summarized below:

Groups	Mean Test Score	S.D.	S.E.m	D	S.E.d	D/S.E.d
Failure	32.4	7.54	.46	10.6	0.88	12.0
Malingerer	21.8	5.24	.74			

Although the distribution of raw scores for the failure group conformed to the lower half of a normal curve, making the statistics of probabilities inappropriate, the critical ratio (D/S.E.d) obtained was so great that the operation of chance factors to produce the difference is practically eliminated from consideration. Apparently, malingerers fear that they may defeat their own purpose by passing the examination unless they score quite low, with the result that they score, on the average, considerably below the genuine failures. It is probable that the more cautious the malingerer, i.e., the greater his fear of detection, the less the number of items which he will deliberately fail. His test score will tend, therefore, toward the higher failing score, while his malinger-ing score will tend toward the lower malingering score. In actuality, he is malingering to a lesser degree than the less cautious malingerer although his objective is the same.

The responses to each test item for each member of the good, failure, and malingerer groups were recorded upon item-analysis sheets. The correct and incorrect choices were entered. Preliminary inspection of the particular incorrect choices revealed that the slight advantage that might accrue from their use would not compensate for the increased difficulty of scoring; and so they were not considered further. In order to avoid constant handling of the original test papers, single-line window keys were devised which enabled rapid scoring directly on the item-analysis sheets.

*Validity.* Based upon different premises and standards used in the selection of items, twelve malingering keys were constructed. Each key was applied and the resulting distributions of malingering scores were analyzed to ascertain the "critical scores," or scores allowing the least amount of overlapping between the failure and malingerer groups. The



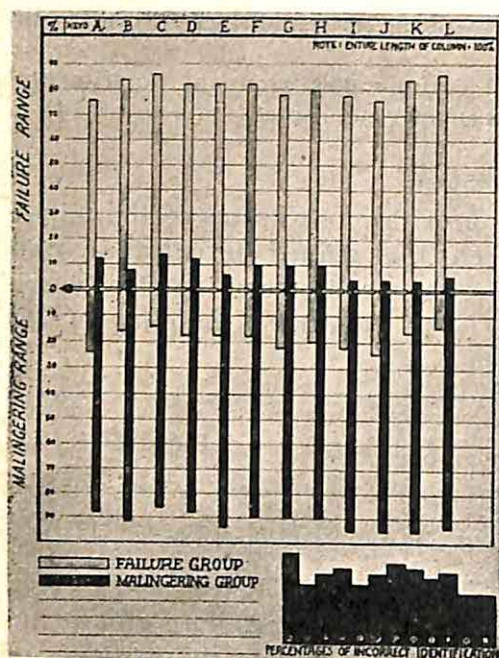


FIG. 1. Per cent of correct identification of "failures and malingeringers" by different scoring keys.

tions would be one hundred. Such perfection would hardly be expected in any case, especially so since the failures and malingeringers may not have constituted pure groups, i.e., some failures may have been malingering and some malingeringers may not have been capable of passing the examination.

Since the ability to differentiate between groups that are known to be different is one measure of the validity of an instrument, the high percentage of correct identifications afforded by the malingering keys constitutes an index of their validity. Figure I gives a graphic portrayal of the extent to which the various keys differentiate the failure and malingering groups. It is to be noted that in all cases the amount of overlapping of the two groups is very small.

It was observed that the use of the more rigid standards in the selection of items tended, within limits, to yield more effective keys. However, a point is reached where the decreased reliability resulting from the loss of too many items reduces the effectiveness or differentiating power of the key.

Another index of the validity of the keys was furnished by determining the reliability of the difference between the failure and malingering groups. The critical ratios for the different scoring keys (represented by the ratio of the obtained differences to their standard errors) ranged

percentage of correct identifications for each key was computed by adding the number of failures in the failing range to the number of malingeringers in the malingering range. Since there were exactly one hundred subjects in the combined groups, this procedure gave the desired percentage directly.

The percentages of successful identifications of failures and malingeringers with the various keys ranged from eighty-two to ninety per cent. It was clear that several of the keys were almost equally effective, the differences being so small as to be attributable to chance factors. Theoretically, if all failures and malingeringers were successfully identified, the percentage of correct identifica-



from 7.4 to 13.3, values so high that they lie outside the range of published tables of probabilities. A critical ratio of three is ordinarily interpreted to establish statistical significance. The extraordinarily high critical ratios which were obtained most decidedly confirm the validity of the malingering keys. Parenthetically, it may be noted that the military personnel at the induction station were no more successful than the experimental malingerers in avoiding detection upon simulating malingering.

The key that was finally selected as most effective allowed double weight to those items which were common to all keys. The weights were assigned on the assumption that the greater the number of keys on which a given item appears, the better the item, since it survived all variations in premises and standards. The resulting improvement, which increased the previous maximum percentage of correct identifications of the combined failure and malingerer groups from eighty-eight per cent to a new high of ninety per cent, justified the procedure. Applied to the separate groups, the key correctly identified ninety-six per cent of the malingerers and eighty-four per cent of the failures. Or, stated differently, four per cent of the malingerer group, as against eighty-four per cent of the failure group, received low malingering scores; whereas, ninety-six per cent of the malingerer group, as against sixteen per cent of the failure group, received high malingering scores. The differentiating power of the key is also most positively demonstrated by the critical ratio value of 11.3, obtained by comparing the malingering scores of the failure and malingerer groups. The subsequent analyses are limited to this key alone.

*Scoring.* Used as a scoring stencil, the malingering key resembles the key for the Visual Classification Test but exposes only eighteen of the fifty items. The scoring is accomplished by placing the key over the test paper and giving one or two points, as indicated, for each of the checked items failed and one point for each of the crossed items passed. The reduced number of items on the malingering key facilitates rapid scoring. The following items, with their corresponding weights, are included in the key:

Item	Weight	Item	Weight	Item	Weight
1	✓✓	12	✓	28	×
4	✓✓	13	✓✓	31	✓
5	✓✓	15	✓✓	34	×
7	✓✓	17	✓	36	×
8	✓✓	18	✓✓	39	×
11	✓	20	✓✓	44	×

The resulting malingering scores may range from zero to twenty-seven points. A malingering score of eleven points was established as the point of maximum differentiation between the failure and malingerer



groups, allowing the least percentage of error of identification. To raise the score would increase the number of malingerers eluding the key; whereas, to lower the score would increase the number of failures subjected to suspicion of malingering.

*Consistency.* In order to see whether another group of failures, whose papers had not been used in the actual construction of the keys, would give results similar to those of the original failure group, the malingering scores were ascertained for a sampling of one hundred representative failing papers. Fourteen per cent, or two per cent less than in the original failure group, fell into the high malingering range. In similar fashion, the experiment was repeated for a group of simulated malingerers, with this variation: the subjects were tested to determine their true ability on the Visual Classification Test. The few failures on the test were not considered further, although they remained with the group. As in the first experiment, many subjects tried to pass the examination although instructed to mangle, and it was again found necessary to repeat the instructions. Apparently, the concept of simulated malingering is difficult to grasp. This time only one mangle (two per cent of the group) managed to circumvent the key. Combining the first and second experiments, only three out of a hundred known malingerers achieved low malingering scores; while fifteen per cent of presumably genuine failures received high malingering scores.

The following excerpt from a letter to the writer, although describing very few cases, adds interesting "negative" evidence on the validity of the malingering key:

While I was at the Boston station we had a few interesting experiences with the key. A team of examiners, of which I was a member, made a trip to the State Reformatory to examine inmates there who were being considered for parole in order to be inducted into the Army. We had to give VCT's to some seven of the men, and we scored all the papers for malingering, getting malingering scores of zero to three! This was interesting because in the particular group the urge *not* to mangle was strong.

*Reliability.* A more refined analysis of the consistency of the malingering scoring key was attempted through the determination of the reliability coefficient. Since the reliability of the key was presumed to be dependent to some degree upon the reliability of the Visual Classification Test (the key having been constructed upon the basis of test patterns of performance) the latter instrument was likewise analyzed for reliability. The reliability coefficients, determined for various groups and combinations of groups, were obtained by the split-half method applied to the odd and even scores. They were then corrected by the Spearman-Brown formula and their probable errors were computed.

The highest corrected reliability coefficient for the Visual Classification Test was .91, as determined on the basis of the combined good and



failure groups. These groups, taken together, correspond to a normal population. The highest corrected reliability coefficient for the malingering key was .73, as determined on the basis of the combined good, failure, and malingering groups. It is likely that this reliability is deceptively low, as a result of the complete absence of reliability of the malingering key for the good and the failure groups. Both of these groups had reliability coefficients approaching zero, values within the limits of their own probable errors and therefore attributable to chance.

This absence of reliability of the malingering key for the good and failure groups, which are non-malingering groups, is additional evidence in support of the key. The malingering scores for these groups should have been purely chance scores; and chance scores, by definition, are uncorrelated.

*Further investigations.* Under the authorization of the Personnel Consultant of the Mobilization Section, the malingering key was tried out experimentally in the six induction stations of the Fifth Service Command. The statistics were received by the Personnel Consultant who forwarded them to the writer. For the purposes of conserving space, the statistical tables are not included in this report and only the essential findings are indicated:

1. The median malingering score for 7,039 test failures was 6.4 points, or one point above a purely chance score of 5.4 points (one-fifth of the twenty-seven points on the scale). The difference was probably caused by the presence of malingerers whose high malingering scores raised the average for the group. The median malingering scores for the different stations ranged from 5.8 to 6.9 points.

2. Exactly seventeen per cent of the test failures received high malingering scores. Four of the six stations fell between the limits of 16.1 and 18.1 per cent. The other two stations fell at 10.0 per cent and 25.1 per cent, respectively. The differences in the data submitted by the latter stations may possibly be accounted for by differences in the nature of the groups (cultural or cooperative); or by differences in the method of test administration (motivational intensity, emphasis on speed, allowance of omissions, etc.).

3. A scatter diagram submitted by one of the induction stations for a sampling of 381 cases showed an obvious inverse relationship between the test scores and malingering scores. This may be interpreted in either of two ways: a) Low test scores force the accompaniment of high malingering scores by nature of the construction of the malingering key; or b) The lower the score on the examination, the more the number of items that might have been subjected to malingering. The former interpretation may be ruled out by the following facts: fifty-two per cent of the failures with test scores between sixteen and twenty points obtained low malingering scores, some getting malingering scores as low as five points; several failures with test scores between eleven and fifteen points, barely above chance scores, received low malingering scores.

4. The malingering scores associated with the higher failing test scores conformed to a normal distribution curve, with the mean approximating the theoretical chance mean of five points, showing that the malingering scores below the critical value of eleven points are in all likelihood chance scores.



## APPLICATION AND INTERPRETATION

A high malingering score, in and of itself, may be interpreted statistically as performance-deviating-from-the-normal, and as such warrants further investigation. The atypical, fluctuating sort of performance or "internal scatter" which yields a high malingering score constitutes the typical performance of the malingerer. However, it has also been found associated with certain factors other than malingering. Although it should be noted that, by and large, these other factors tend to be of relatively infrequent occurrence, they are listed below to caution the examiner against attributing every high malingering score to a malingering performance. These factors include:

1. An organic condition of the brain or central nervous system;
2. Psychic lapses associated with petit mal epilepsy;
3. Psychoneurosis;
4. Unstable personality;
5. Emotional blocking;
6. Low-grade feeble-mindedness;
7. Misunderstanding of test directions;
8. Skipping of items;
9. Overemphasis on speed;
10. Preoccupation or mental wandering;
11. Visual defects;
12. Cultural factors.

A brief statement of the reasons why some of the factors listed above may produce high malingering scores should help to clarify the operation of the key. For example, it has been observed that many cases diagnosed by the psychiatrist as psychoneurotic obtain high malingering scores. In some instances, this may simply indicate malingering at both stations; in others, the fluctuating performance associated with the high malingering score may be symptomatic of psychoneurotic behavior. It is interesting to speculate upon the possible diagnostic value of the instrument along psychiatric lines.

The presence of an organic cerebral syndrome, as in confirmed brain injury or lues, has been found associated with high malingering scores in a number of instances. It is a plausible supposition that the condition interfered with normal mental functioning and produced marked unevenness or scatter in test performance.

Low-grade feeble-mindedness is frequently accompanied by a high malingering score because the choices are made largely at random, with the result that many easy items are failed and some difficult items are passed. Most of the high malingering scores in the genuine failing group are accounted for in this fashion. Fortunately, low-grade feeble-mindedness is relatively easy to recognize.

Cultural factors may operate to produce a high malingering score



for the reason that items which are easy for the general population may be unfamiliar and consequently difficult for certain cultural groups. For this reason, high malingering scores are of dubious validity for Chinese, Mexicans, Indians, Filipinos, and possibly other groups. However, northern Negro groups do not appear to be unduly influenced by the operation of cultural factors.

One other caution may be noted. Some men who actually are incapable of passing the examination score deliberately below their true ability and get high malingering scores. Frequently, retest scores subsequent to the interview show an increased test score still below passing with a considerable reduction in the malingering score. It would not appear advisable to recommend these men for induction.

#### INTERVIEW AND RETEST

It is unnecessary for the psychological examiner to determine which of the factors described above, if any, may have been responsible for a given high malingering score. However, unless additional evidence of malingering can be procured, the malingering score, in and of itself, should not be accepted as conclusive evidence of malingering. The usual method for obtaining this additional evidence is by means of an interview and retest. Although a marked gain in retest score is not absolute proof of malingering on the first test, it does constitute strong presumptive evidence on that point. In any event, a marked improvement may generally be taken as fairly good evidence that the first test score was at a sub-typical level and hence not a valid index of true ability. A passing retest score may reasonably be interpreted to rule out a diagnosis of mental deficiency.

The approach to be used in dealing with men suspected of malingering depends upon the ingenuity of the examiner and the personality and attitude of the selectee. Wide experience with the key has convinced the writer that improved retest performance is ordinarily best effected through the use of some face-saving device, although a blunt accusation of malingering is sometimes necessary. One approach which has proved highly effective in most instances, without introducing the danger of unjust accusation, involves approaching the selectee with a blank test form and explaining good naturedly that apparently the man had not understood what the first test was all about since he scored so exceptionally low; in fact (he may be told), he did only as well as children of seven or eight years. Since this obviously does not make any sense, the test will be repeated, and this time he should pay careful attention and be sure that he understands what he is to do. Then three or four sample items are re-explained and the test repeated.

Another approach that has proved successful is to explain that the examiner is puzzled by the peculiar test performance. It is pointed out that, as a result of experience with thousands of men, we know which are the easy items and which are the hard ones. We are puzzled over the fact that this man has failed many very easy items, which practically everybody gets right, and has passed a



number of very hard items that very few men can get right. If he cannot do the easy ones, it is strange that he has been able to do the hard ones. If he can do the hard ones, it is odd that he missed so many easy ones. It is then explained that this man probably did not pay as close attention to the test items as he might have and that the test will therefore be repeated. This time he is expected to concentrate on the test and make sure that he does not miss the easy items. Just to be certain that the man understands, some sample items may be readministered.

The approaches described above have produced remarkable increases in retest scores, ranging from fifteen to twenty-five points or more. In some instances, of course, the suspect may refuse to budge from his position and again fail the test miserably. Here the examiner must rely on other evidences of malingering that may be elicited by the interview. Where corroborative evidence in support of a high malingering score can be adduced, a recommendation for induction appears to be warranted. However, where such corroborative evidence is lacking, a recommendation for induction would seem questionable. The malingering score is suggestive only and not conclusive.

#### CRITICISMS

The following ingenious criticism of the malingering key was submitted by the psychological officer at one of the induction stations:

A malingering scale should show no malingering score for the person making a high score on the Visual Classification Test. In using the present scale, it is possible, theoretically, for a person to pass the test and yet have a malingering score of 24!

10 easy items omitted or answered incorrectly	
9 with double value.....	18
1 with single value.....	1
5 difficult items answered correctly.....	5
Total.....	24

The answer is that it simply does not happen. The highest malingering score actually obtained in the good group was eight points, which is three points less than the critical score value.

A more serious criticism is the suggestion that experimental malingerers may not give the same type of performance as real malingerers. To this criticism, which is essentially an expression of skepticism, the following arguments are offered in rebuttal:

1. The criticism in no way affects the genuine failure group, which has been found to be effectively screened by the use of the key.
2. The criticism fails to account for the number of "proved" malingerers detected by the key.
3. Although the motivation of experimental and true malingerers is different, it is difficult to see how this can alter their mode of performance on the examination. In both instances, the objective is to feign feeble-mindedness and to fail-in-such-a-fashion-as-to-deceive. The only possible way, aside from pure ac-



cident, to achieve a low malingering score is to assume the thought patterns of the mentally deficient. That this is an extremely difficult thing to do is confirmed by published researches. (See references.)

4. From a purely statistical viewpoint, if from no other, the relative infrequency of high malingering scores makes such scores interpretable as indices of performance-deviating-from-the-normal and consequently subject to further investigation.

5. Since the key is designed as a tool to supplement rather than supplant the interview, it becomes an additional barrier for malingerers to hurdle.

#### SUMMARY AND CONCLUSIONS

On the basis of experimentation involving the use of good, failure, and simulated malingerer groups, an effective instrument for the detection of malingering on mental tests was devised. Although specifically adapted to the Army's Visual Classification Test, the methods which were originated in its construction are applicable to other psychological tests.

The procedures which culminated in the malingering key consisted of subjecting the experimental data to statistical analyses predicated upon three premises taken independently and in various combinations. Each premise or combination of premises, at a particular standard for selection of items, provided the statistics for deriving a different scoring key. Several promising keys were then combined, to make a total of twelve different scoring keys. These keys were ultimately compared and evaluated in terms of their ability to differentiate successfully between genuine failures and simulated malingerers; and the most sensitive key was finally selected. A moderate standard for the inclusion of items in the scale gave optimum results.

The malingering key requires no additional testing, being applied as a scoring stencil directly upon the failing test papers. It yields a score suggestive of possible malingering or sub-typical performance. Designed to supplement the interview, it serves as a rapid screening device for genuine failures and as a suspicion indicator for possible malingerers.

In the original failure and malingerer groups, only four per cent of the malingerers eluded the key, whereas sixteen per cent of presumably genuine failures were subjected to suspicion of possible malingering. Applied to a new group of simulated malingerers, only two per cent eluded the key; whereas fourteen per cent of an additional sampling of one hundred failing papers gave scores suggesting the possibility of malingering. Combining the results, the key was successful in identifying ninety-seven per cent of simulated malingerers and eighty-five per cent of presumably genuine failures. The reliability of the difference between the mean malingering scores of failures and malingerers was so great that the obtained value fell outside the range of published tables of probabilities.



In extensive field trials with thousands of cases distributed among a half dozen induction stations, the malingering key eliminated from seventy-five to ninety per cent of test failures as non-malingers, thereby enabling the examiners to concentrate their attention more fully upon the remaining few. At the writer's station, a considerable number of men with neutral histories but high malingering scores was prevented from evading military service. Proof of the mental adequacy of these men was established on the basis of remarkable increases in retest scores following an interview. The use of a face-saving approach of some sort was found to be especially successful in effecting improvement in retest performance. Similar retesting of failures with low malingering scores was unsuccessful in effecting such improvement in most cases.

Although the malingering key was found to give especially good results, it is probable that a test especially designed for the purpose would enable the key to function even more effectively. For optimum results, such a test should probably have the following characteristics: 1. a liberal sprinkling of easy items; 2. items of varying degrees of difficulty; 3. a scrambled sequence. Once available, the key should be applied routinely to all failing papers. It is the writer's opinion that the construction and use of keys for the detection of sub-typical or unstable performance on other mental tests should contribute significantly to improved testing practice and clinical diagnosis.

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## BOOK REVIEWS

RIBBLE, MARGARET A. *The rights of infants. Early psychological needs and their satisfaction.* New York: Columbia Univ. Press, 1943. Pp. x+118.

In her introduction the author of this book indicates four purposes in its writings as follows:

1. to determine some facts about the psychological needs of small infants.
2. to find out more of the nature of the first personal relationship between the baby and his parents and the effect of this highly personal first adjustment on the future personality of the child.
3. to determine to what extent tendencies toward poor nervous organization existed in some babies at birth, and whether such tendencies might develop or increase in response to the wrong parental care, and
4. to what extent strong emotional attitudes in the parents or in a child's nurse may affect the rapid and sensitive personality development taking place in the first year of life.

This represents a splendid research program, one greatly needed in the area of infant behavior investigation. The author points out that research on the nutritional and medical care of infants has made valuable contributions but that the earliest psychological needs of babies demand as careful attention from the scientist. One can heartily agree with this viewpoint.

The author apparently brings to the writing of her book an impressive background of experience with both infants and mothers. She says that some 600 healthy infants were observed and a group of children suffering from birth routine care followed together with a group of children suffering from birth injuries. In addition infants in the home were studied, as well as 20 premature babies with functional disorders of breathing, circulation, or nutrition and borderline cases including a microcephalic idiot. Twenty children were followed from birth for four years to watch the child-mother relation. A group of 100 expectant mothers was observed, and mentally ill adult patients were studied intensively.

Some of the topics discussed concern the baby's right to a mother, oxygen hunger, sucking, learning to feel, thwarting, emotional development, getting ready to think. The theme that continuously runs through the chapters is the concept of *mothering*. The term is defined as a "continuance of the conditions of the prenatal state, and the more clearly it imitates certain of the conditions before birth the more successful it is in the first weeks." . . . "Mothering also means understanding an infant's biological needs. The child has not one but three hungers: he has a hunger for oxygen, and a craving to feel as well as to eat." To this biological or embryological concept of mothering is added physical and social aspects such as "fondling, caressing, rocking, and singing or speaking to the baby."

According to the author, the beneficial effects of *mothering* are numerous. It will aid in the cure of marasmus and respiratory difficulties, it is related to smooth speech development, it is the primary factor enabling the infant to pass through the sucking stage, it satisfies the infant's "stimulus hunger" defined as "an inborn need preceding the true emotional longing for the mother," it precludes "in all the delicate processes through which the infant feels his way outward," it prevents convulsions and shock, it cures the rolling habits in which some babies indulge during sleep, it prevents stupor or a kind of hibernation observed by the author, it improves blood circulation, it acts as the child's



brain. As a result of mothering "the child gradually combines and coordinates sucking, or food intake, with sense intake, looking, listening, and grasping," and this provides the basis of a "photographic image registered in the brain." And finally it prevents precocious sexual development.

The author says that she has found in her researches that the absence of proper mothering may result in shock, croup, constipation, bleeding from the navel, coughing, hiccoughs, violent crying, temper tantrums, body tenseness and rigidity, the dangers of weaning, mucous diarrhea and bad toilet habits.

The contents may be considered either from the standpoint of popular reading or as a scientific discussion. On first opening the book, one is given to understand that "the ideas presented in this book are based on a long series of studies, from many angles, of babies and their parents." However, anyone interested in a scientific presentation of the results of the studies or in a popular presentation of scientific findings will be disappointed. Notwithstanding the impressive number of subjects which the author has had for purposes of observation, one distinctly has a let down feeling when he looks for a scientific treatment of the data. At best the reader is offered only cursory descriptions of so-called typical cases. There is no statement of how the researches were conducted, how the various groups of data were collected, what scientific precautions and controls were used to safeguard the studies, or by what methods the presumably large accumulations of data were analyzed. Indeed none of the data themselves are presented in either a technical or nontechnical manner to buttress the vast array of generalizations found in it. There is no discussion of the fundamental and difficult problems of the reliability of the supposedly many observations made by the author. The materials consist in a jumble of everyday common sense, Freudian theory, conclusions based on single cases supposedly typical, and references to the primitive customs of the Sioux Indians, South African tribes, European peasants and negro mammals.

Not only is the reader left completely uninformed about the methodology employed in the studies, but as far as can be judged from the materials presented in the volume, not one of the research objectives stated in the opening paragraphs of this review has been realized in any acceptable systematic manner. To realize them will require a set of well designed, carefully conducted experiments continuing over a considerable period. They represent a possible program for diligent investigation before any empirically founded generalizations can be asserted.

If this book is to be regarded as a popular presentation it will be misleading to the average reader, for it gives merely the aura of scientific sanction without its substance. A popular treatment need not be inconsistent with scientific carefulness. This book presents many statements for which there is as yet no scientific verification. Many of the views expressed indeed may make an appeal because of the sentimental concept of mothering and because of the bizarre claims for it. The book will probably be popular with a section of the psychologically unsophisticated public, it will annoy every rigorous minded investigator who will regard it as below standard both as an example of research and of popular writing about scientific matters.

*Iowa Child Welfare Research Station*

ORVIS C. IRWIN

DEUTSCH, HELENE. *The psychology of women: Vol. I.* New York: Grune and Stratton, 1944. Pp. xiv + 399.

In the author's own words, "The purpose of this book is to explain the normal psychic life of women and their normal conflicts" (x). The data on which



she bases her conceptions of the normal woman, however, are drawn from her psychoanalytic practice, supplemented by arm-chair interpretations of such historical abnormalities as George Sand, and various literary creations.

The plan of the book is a detailed exposition of the development of the so-called feminine personality. Starting with *prepuberty*, the reader is led through *early puberty*, to *puberty and adolescence*, with a separate chapter devoted to *menstruation*. By this time he is presumably ready for initiation into the mysteries of *eroticism*, *passivity* and *masochism* which lay bare the adult female psyche. The concluding discussions concern deviants from the *normal* course of development in the form of *active* women and homosexuals. The main emphasis throughout the book is on internal, biological process rather than external, social force. A sole, final chapter is devoted to *the influence of the environment*, and even this is little more than an attempt to prove how little influence is exerted by the environment and a declaration of faith in the eternal biological verities.

As a contribution to understanding the psychodynamics of certain forms of neuroticism to which women in our culture seem prone, Dr. Deutsch's book may well contain many valuable insights. The reviewer does not feel qualified to judge. As a contribution to the scientific understanding of normal women, Dr. Deutsch's book had better not be taken too seriously. Once again, the psychologist is confronted with all the familiar weaknesses of Freudianism. Although her data are admittedly *cases* and her methods, *intuitive* without the slightest attempt at quantification or control, the author does not hesitate to generalize her observations from the sick to the healthy woman. Such generalizations are always misleading and may result in a flagrant devaluation of woman's contribution to social welfare. The following quotation speaks for itself:

Only psychoanalysts ever learn that progressive girls who sometimes participate in the struggle for woman's political emancipation, and give lectures on the need for the sexual enlightenment of children, still cling in their unconscious to the theories of early childhood, deny anatomic differences, retain the anal idea of childbirth, and base their ideas of sex on the sadistic conception of coitus" (118).

Another Freudian *slip* that Deutsch is guilty of is a dogmatism in the statement of hypothetical points which lends them a false aura of established fact. The merest hunch is expressed with the abandon of the fictionist whose ingenuity is not in the least hampered by truth. One can hardly fail to admire the imaginative display which has created nearly 400 pages on a topic which a scientific account would exhaust in a quarter of the space. Among the innumerable statements confidently made without a shred of evidence, we find, "... woman's intellect, her capacity for objectively understanding life, thrives at the expense of her subjective, emotional qualities" (143). And in the same vein, "... intuition is God's gift to the feminine woman ... all observations point to the fact that the intellectual woman is masculinized" (291).

While the psychologist has tolerantly and often generously accepted the psychoanalyst's fanciful *closing the gap* in the absence of fact, his patience comes to an end when fancy persists in the face of contradicting fact. This unpardonable breach of scientific code occurs repeatedly throughout *The Psychology of Women*. Dr. Deutsch's thinking seems to be so circumscribed by the psychoanalytic solipsism that she is apparently unaware of the vast world of psychological research outside. For example, in her evaluation of the psychological importance of menstruation, she cites her own work and that of other analysts almost exclusively. The only experimental study to which she refers



is that of Benedek and Rubenstein whose findings are too good to be accepted as true without verification. Ignoring the work of Landis, Brush, et al., she is still making statements that have long since been disproved: "All observations suggest that, whether or not the girl is given intellectual knowledge, even when she has the best possible information about the biologic aspects of the process, and despite its wish-fulfilling character, the first menstruation is usually experienced as a trauma" (157). Another anachronism to which the author clings is the assumption that the continuation of normal activities during menstruation represents resistance to femininity.

Deutsch's ignorance of medical as well as psychological work appears again in her biological interpretation of sexual frigidity. No one who is familiar with the results of Dickinson's half-century of gynecological practice could say, "our understanding of feminine frigidity . . . can be complete only if we take into consideration the fact that there is a constitutional inhibition that has no parallel in men" (185).

Statements that are unverified are bad; those that have been disproved are worse; but statements that can never be proved or disproved are by far the worst. When we are told that "later we shall see how sexuality and motherhood are often in absolute emotional contradiction, and how they nevertheless merge in the deeper and unconscious life of the soul" (148), the scientist knows that he has no place here either as student or critic.

What causes the social psychologist the most concern in the present volume is the author's underestimation of the role of environment in the psychology of women. In the repeated referral of feminine behavior to presumed constitutional factors lies the danger of an unwarranted pessimism regarding women's potential contribution to postwar society. In attempting to explain women's inferior intellectual showing in comparison with men, obvious differences in stimulation and opportunity are overlooked in favor of the fantastic notion that "the feeling of insecurity in creative activity corresponds to the deep-rooted need of woman to be fecundated from outside in order to be creative" (132). The author again defies the law of parsimony by attributing feminine passivity to the girl's realization of her inadequate sexual apparatus rather than to social training. In line with her assumption of an essential passivity is her *Kinde-Kuche-Kirche* conception of the postwar woman. She believes that "the majority of women whom war has made more active than ever, will return as quickly and energetically as possible to the basically conservative because of always dominant feminine experience, regardless of social and cultural upheavals" (386, italics mine). The fact that many employed women will return home is probably true. The reason, however, is probably not the one given by Dr. Deutsch. The findings of biology, anthropology and psychology have consistently failed to reveal constitutional sex differences which would justify casting men and women in different social roles. The reason why women in Western culture have continued to play the passive, domestic role should be sought in the structure of the culture rather than in the individual.

In spite of its obvious scientific flaws, *The Psychology of Women*, written in a fluid, non-technical style, and supported by all the prestige of an established psychoanalyst, can hardly fail to influence the intelligent layman. In this fact lies a grave threat to any program of postwar social planning which aims at a fuller sharing of men and women in all areas of living.



LEPLEY, RAY. *Verifiability of value*. New York: Columbia Univ. Press, 1944. Pp. ix + 267.

The central thesis of this book is that, contrary to the widely-held view, value judgments are verifiable in the same manner and to much the same extent as are propositions about facts. The author, finding that a spirit of open inquiry is gradually emerging in our society toward problems of social and international relations, and feeling that greater extensions of this experimental attitude in these areas must be realized if mankind is to achieve lasting freedom from conflict, seeks to develop the implications of this spirit for social action and to justify the testing of values which it implies. If values can be verified and men are willing to put them to the test and abide by the results, as is done in science, conflicts can be resolved and human energies rescued from wasteful tension and strife. The central topic of the study, therefore, is the nature and extent to which verification is possible in the fields of social, artistic, and religious values. The author concludes from his analysis that value judgments can be analyzed and tested for adequacy in much the same way as statements about facts.

To establish this point of view, detailed analyses of factual and valuative judgments in science, art, and morals are carried out. After distinguishing between various meanings of the term *value*, the nature of verification of propositions about facts and values is examined and a comparison made between the processes in the two cases. Consideration of simple problems indicates that the same general pattern of verification is present in morals and art as in science. Values are testable in much the same manner as facts. There do not appear to be absolute differences in verifying propositions about facts and propositions about values. But even though the verifying process is in essence similar, there may be differences in the degree to which factual and value judgments may be verified. A series of empirical analyses of the degree of verifiability of propositions about facts and values in science, art and morals reveals that facts and values are equally verifiable though moral facts and values are probably less verifiable than scientific facts and values. All types of values are potentially equal in verifiability and unverifiability. In their own ways, art and morals may be as experimental as science.

Though this viewpoint be accepted in the large, it is evident that a more detailed analysis and examination of the characteristics of the processes involved in the enterprises of science, art and morals is called for as the process in each area has its own peculiar character. The author devotes four chapters to an analysis of characteristics which have often been taken as characterizing facts as opposed to values and as forming the basis for the antithesis of the two. He analyzes the concepts of qualitative and quantitative, descriptive and normative, factual and creative, and objective and subjective. His general conclusion is that these characteristics of facts and values respectively are not absolute and do not sharply separate the two. On the contrary, all these properties which contrast superficially are found on examination to be present in fact-finding as well as value-judging activities. Distinct in their own ways, these activities involved in fact-finding and in value-judging are not intrinsically different and the properties listed above which are generally constitutive of them are more the effects of slightly different directions of attention and emphasis in formulation and testing than of basic variance.

Analysis of the ontological status of facts and values shows them to have a similar status in reality and to have determinate bases in the actual character of events. The study closes with a discussion of the consequences for action in



the social sphere which the adoption of an experimental attitude toward values would have and the social benefits which would accrue.

In following the course of ideas in this work it is extremely important for the reader to note that the author is dealing primarily with *instrumental* values. When we say that object is good for something we attribute value to it by virtue of this characteristic. The author reveals the type of value which he is dealing with when he says, "We shall suppose that problems . . . are *valuative* in which the interest is mainly in events as means to other events" (24) and in the examples he selects. In the case of this type of value verification is a straightforward though undoubtedly in many fields a novel process: with standards agreed on, the degree to which the object, the means, achieves the events desired, the ends, is examined. The object's value is relative to its accomplishment and to the importance of achieving it. But with *intrinsic* values this does not appear to be the case at all. When we find that an object is good in and for itself, as is apparently the situation with the beauty of a work of art or the characteristics we prize in human personality, we appear to be making a different kind of statement than when we attribute instrumental value and verification does not seem relevant. The author does not deal with the question of whether verification is relevant at all for intrinsic values; one notes that he states that a future work will deal with the *translation* into factual terms of statements denoting intrinsic values as well as instrumental, so we take it that he is aware of the problem. Recognizing that the author is really dealing only with instrumental values, his analyses are acceptable and his conclusions generally appear justified. However, the meanings of many key concepts is not too clear—*adjustments*, *total adjustment courses*, and *interest events* for instance—and probably only the reader who accepts and understands the philosophy of Dewey and his followers will feel completely satisfied.

EDWARD N. BARNHART

Office of Strategic Services  
Washington, D. C.

WOODWORTH, R. S. & SHEEHAN, MARY R. *First course in psychology*. New York: Henry Holt, 1944. Pp. viii + 445.

This book was written specifically for high school students to fill the need portrayed by the American Youth Commission in its 1940 report to the American Council on Education. However, with only little supplementing it could serve adult education classes on the non-collegiate level. This reviewer has not found a more adequate and sensible discussion of reading, learning, and memorizing in relation to studying than chapters III to VIII; these parts at least would be useful for the freshman orientation shelf in college.

The 27 chapters make convenient weekly units for a full year's course, but the authors outline lists of chapters for half-year courses in general psychology, mental hygiene, guidance, and a course stressing the psychology of learning. This book is a complete psychology with all the topics ordinarily discussed plus a few additions like propaganda analysis and vocational guidance. The order of topics is seemingly random, but many cross-references help to correlate the parts of the book.

The style is lively and direct with an urbane humor and reserve that keeps it from *talking down*. Many fresh examples from literature and current public and school life, including the war, make interesting reading.



A serious problem for psychology, in common with other subjects, in the high school is the probability that its teachers may not always have specific training and background for the subject. Realistic evaluation of a text should include consideration of whether it is true enough and complete enough to support the teacher who leans heavily on it. Woodworth and Sheehan is clear and definite and to make the meaning unmistakable, every chapter is ended with a complete summary where the important words are italicized and also included in a glossary at the back of the book.

This is applied psychology with investigators unnamed and practically no explicit experiments and theory. Beyond the authoritarian assurance of the writers the evidence for points is mostly analogy or appeals to personal experience. The interesting exercises are more observational and literary than experimental. Woodworth and Sheehan may well have hit upon the formula for a successful high school psychology: Give the high school student a complete applied psychology which emphasizes its relation to his experience, and leave for the college course the systematic study of theories and critical examination of supporting experiments. Too many of the high school texts are simply watered-down replicas of the college subject, so fragmentary that they give neither a good foundation nor have practical value. One hears chemistry professors say that they prefer a naive student who has no high school chemistry to unlearn. And then there are the complaints of students that the college course is "just like the one in high school." Neither of these complaints would follow use of this text.

The big lack in the book is the total absence of references or suggestions for further study. There is an excellent bibliography for wide reading on vocations, but no suggestions for the inquiring student or, perhaps even more, for his teacher to go beyond the text. At least the authors should provide teachers and high school librarians with a selected list of non-technical psychological books. The regular psychological journals are formidable and to a large extent barren for the uninitiated; college textbooks usually need the lecturer's presence to vitalize them; the high school student with his interest aroused and with the good psychological vocabulary gained from this book has, unless adequate sources are pointed out, nowhere to go except the sometimes questionable psychological column of his newspaper or the popular magazines with *psychology* in their title.

Woodworth and Sheehan as authors of the first complete psychology for the high school have pioneered so well that they speed the day when psychology will be a part of the revised high school curriculum.

GEORGE M. HASLERUD

University of Tennessee

HOFF, PHEBE M., HOFF, E. C., & FULTON, J. F. *A bibliography of aviation medicine: supplement*. Prepared for the Committee on Aviation Medicine, Division of Medical Sciences, National Research Council, Acting for the Committee on Medical Research, Office of Scientific Research and Development. Washington, D. C. Springfield, Ill.: Charles C Thomas, 1944. Pp. xiv + 109.

So much literature on the scientific aspects of flying has appeared in the two years since *A Bibliography of Aviation Medicine* (reviewed in *Bulletin*, 1942,



MILTON H. ERICKSON, director of psychiatric research and training at Eloise Hospital (Eloise, Mich.), has recently been promoted to the additional position of associate professor of psychiatry at the Wayne University College of Medicine (Detroit, Mich.).

CHARLES W. HOWARD, professor of education and psychology, Whitman College (Walla Walla, Wash.), has been appointed dean of the college and professor of psychology, Lewis and Clark College (Portland, Ore.). J. JERRY FOGARTY, former director of education in a War Relocation Camp in Idaho, has been appointed associate professor of education to succeed Dr. Howard.

JOSEPH C. HESTON, instructor in psychology, De Pauw University (Greencastle, Ind.), has been appointed director of the university's Bureau of Testing and Research, which was recently created "to afford a centralized . . . service for both routine group and individual tests in the areas of educational achievement, vocational guidance, and personality adjustment."

The Department of State has granted MUZAFFER SERIF BOSOGLU (known in this country as MUZAFER SHERIF), professor at the University of Ankara, Turkey, a two-year fellowship to work in the department of psychology of Princeton University on a systematic social psychology. Professor Sherif, who studied at Harvard and Columbia Universities and received his Ph.D. degree from the latter university, is best known for his book *The Psychology of Social Norms*. He is also the author of several books in Turkish.

AGNES SHARP is now a psychological consultant for the A. B. Dick Company, with responsibility for formulating policies and suggesting changes in procedures which may be of value for the psychological welfare of the employees. She has secured a year's leave of absence from her position as Chief Psychologist of the Psychiatric Clinic of the Municipal Court. Mr. CARL PETERSON is filling the vacancy created there. Dr. Sharp is retaining office hours for private practice in consulting psychology in the Willoughby Tower Building, 8 South Michigan Avenue, Chicago.

T. C. SCHNEIRLA, associate curator in the department of animal behavior of the American Museum of Natural History, New York, and associate professor of psychology at New York University, left the second week in November as Fellow of the John Simon Guggenheim Foundation for southern Mexico, where he will conduct field investigations of army ant behavior in the rain forests of that region. Dr. Schneirla's previous investigations of *Eciton* behavior patterns have been confined to work carried out during the rainy season at Barro Colorado Island and elsewhere. From December through April he plans to examine the effects of dry-season conditions upon the reproductive cycle and its relation to raiding and colony movement.

The *Inter-Society Color Council* of which the APA is a member, will hold its 13th annual meeting Feb. 23 and 24 at the Pennsylvania Hotel in New York City. Friday afternoon will be devoted to reports on the *Illuminant in Textile Color Matching*, and *Distribution of the Primaries in Daylight*. Saturday morning will be devoted to a session sponsored by the American Artists Professional League on *Color from the Standpoint of the Artist*, with four talks, exhibits and an open discussion. Saturday afternoon a business session will be held. Official delegates and other interested members of the APA are invited to attend.



# Psychological Bulletin

## THE PRINCIPAL TRAIT CLUSTERS FOR DESCRIBING PERSONALITY

RAYMOND B. CATTELL

*Duke University*

### I. THE NATURE OF PERSONALITY DESCRIPTION THROUGH CLUSTERS

Only recently has the comparatively stern truth become widely realized by psychologists, first, that research into the underlying mechanisms of personality functioning cannot advance more rapidly than the ability to describe personality, and, secondly, that prediction regarding personality cannot exceed in accuracy the exactness with which personality can be measured. In response to this realization the development of a foundation for personality description and measurement has passed from the stage of clinical, experiential assessment in terms of syndromes and types to more sensitive and exactly quantitative methods, based on correlation and aiming ultimately at measurement in terms of clusters and factors.

Actual studies dealing with the intercorrelation of personality variables, either as clusters or as factors, on an adequate scale and by methods which permit of mutual confirmation of findings, are, nevertheless, still distinctly rare, perhaps because of the considerable labor and technical skill which they require. However, since the need for a foundation, even though an incomplete one, is urgent if much present research effort in personality study is not to be wasted, the moment has come to review what has become available in this field and attempt a preliminary integration.

The present contribution appraises the data of available studies, presents some fairly extensive new data not previously fully published, sifts the findings into an accessible catalogue form and gives structure to the field. It is confined to the description of personality by clusters and omits all that has to do with the further and more debatable interpretation in terms of factors. The 'Nuclear Clusters' required for the description of the total personality are finally presented in a single chart.

In order to side step, at the outset, much current confusion appearing in this field of discussion, it is necessary to indicate briefly how the terms syndrome, cluster, factor, type, trait and trait element are considered



to be related. A syndrome is, of course, a collection of traits, symptoms or trait elements which repeatedly occur together in individuals. A correlation cluster is a set of traits which intercorrelate highly, each with every other, so that high endowment in one trait will tend to appear with high endowment in the others, as an observable clinical syndrome. *Continuous* types—but not discontinuous, or *species* types—also present, at their polar extremes, syndromes. Correlation cluster, syndrome and type are thus, in this sense, aspects of one and the same relation. A trait has to be established, like a syndrome, by observing co-variation in a number of trait elements or restricted pieces of behavior. Hence the difference between trait and syndrome seems to have become, in current psychological literature, nothing more than a matter of extensity or degree. In addition, the term trait has retained a second and widely generic reference, covering any mode of personality manifestation whatever.

The search for what might be called basic traits, principal syndromes or major type forms, in terms of which personality differences may be most succinctly described, has gone ahead in recent years, in accordance with the above viewpoint, in the form of researches to discover what trait elements covary, either in the sense of factors or as clusters. Owing to the indeterminacy of factor analytic solutions, however, a considerable proportion of the workers seem to have preferred the cautious path of describing by clusters rather than by factors. The present writer has suggested that (5) the pattern of behavior commonly referred to by the term trait, in the most universal and useful form of the concept, corresponds to a factor rather than a cluster (6) and has propounded new criteria by the use of which the factor analytic solution of matrices of trait element inter-correlations may be made more determinate and psychologically real (7).

Both cluster and factor methods of recording inter-correlations in simplified form, however, have their use in the progress of personality research. They are not mutually exclusive: clusters, like correlation coefficients themselves, represent the data at a descriptive level; factors at an interpretive level. The functional unities or syndromes corresponding to clusters may be called manifest or *surface traits*. The pattern of elements sharing a heavy loading with any one factor, on the other hand, may be called a *source trait*, for behind that pattern we may expect sooner or later to find a common source or cause. As may have been demonstrated elsewhere (5) it is the source traits, rather than surface traits, which permit of being meaningfully and insightfully sub-divided into *dynamic*, *environmental mold* and *constitutional traits*.

The present review, as indicated above, intends to stop at surface traits. The advantages sometimes asserted for formulation in terms of surface traits are that



1. They are easier to extract than factors, involving less calculation from the matrix.
2. They are less indeterminate and arbitrary.
3. They are psychologically more real.
4. The findings of different researches can be more easily combined at this level.

None of these assertions is true without such modifications as sometimes invert the advantage. When resolving into clusters it is necessary for the experimenter to choose a minimum level of correlation with other traits in the cluster which any candidate trait must surpass in order to be admitted. (This is usually fixed, for no very dominant reason, at about 0.4 or 0.5, giving a mean inter-correlation in the cluster of about 0.60 to 0.70.) For this reason clusters are arbitrary, for the outline of the cluster, i.e., the pattern of traits admitted, may vary a good deal in response to change of admission level as the shape of an island in shallow seas varies with the tidal level. Again, no proof has been offered that clusters are more real and meaningful, in the sense of being more permanent in form, more constant in their re-appearance in correlations taken in different circumstances or more obviously psychologically meaningful. Indeed, in this respect the factor probably has a better claim (5). Finally, regarding facility of resolution, it is commonly overlooked that the extraction of clusters from a large matrix (of, say, more than fifty variables) can be more laborious than resolution into factors (8). Most of the advantages claimed for the cluster are thus illusory.

However, some of the advantages, in the field of objectivity and utility, which the cluster potentially possesses, can be assured if the facts about its real nature are kept in mind and appropriately handled. First one has to realize that most matrices will not resolve into a set of perfect text-book clusters, distinct and self-contained, but only into a ragged network of inter-related clusters. Secondly the situation is clarified if, in unravelling this network, one distinguishes between *phenomenal clusters* and *nuclear clusters* (6, 8). Generally the recorded clusters satisfying the correlation requirement—and which we may call phenomenal clusters—will show mutual overlap about certain nuclear groups of traits. These traits in the nuclear region may be called a nuclear cluster (D in Diagram I below) while the outlying portions (A, B and C in the diagram), remains of the phenomenal clusters, can be regarded as appendages of this nucleus.

Now it will be seen that the outlines (and therefore the psychological interpretation) of a cluster are arbitrary to the extent that a lowering of the correlation giving admission to clusters will variously extend the clusters, bringing, for example, various appendages within the nuclear cluster, enlarging the cluster generally and even fusing two



previously separated clusters. (As, to pursue our analogy, a receding tide may change two islands into one island.)

The actual data of the main chart below show several instances of the difficulty of identifying, or combining, clusters which results from variations of standard between researches. In sectors CB (Dominance) and D (Sociability), for example, the clusters of Maurer and of Maslow,

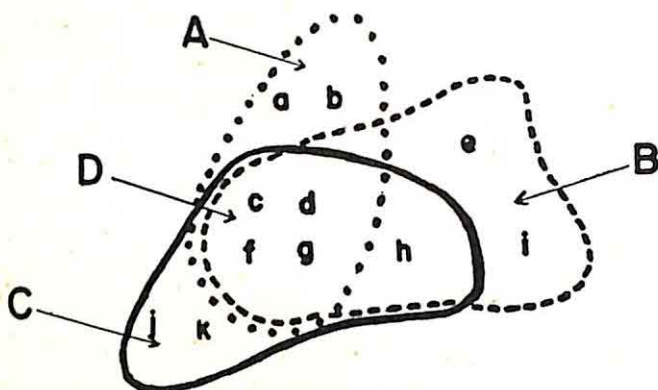


DIAGRAM I

First Phenomenal Cluster, contains variables a, b, c, d, f, g

Second Phenomenal Cluster, contains variables c, d, e, f, g, h, i

Third Phenomenal Cluster, contains variables c, d, f, g, i, k

Nuclear Cluster, contains variables c, d, f, g

adopting less rigid standards of admission, repeatedly straggle over the more restricted cluster nuclei found by Tryon, Sanford, Flemming, McCloy and others.

This relativity or arbitrariness of the cluster, as well as the steps to be taken to control it, become more evident if correlation coefficients are expressed graphically as cosines of angles, as in Diagram II below. When the criterion is that each trait must have a correlation of  $+0.80$  or more with any other trait ( $\cos 37^\circ = (\text{approx}) +0.80$ ) the pencils of traits represented by A, B and C will each represent a cluster (providing, for simplicity, we keep the correlations in two dimensions). It is still, however, arbitrary to draw the line between these clusters at any point, for the trait lines are scattered pretty evenly between the extremes of A and C. If now the criterion be lowered to an  $r$  above  $0.27$  ( $\cos 74^\circ = 0.27$ ), either A and B, or B and C will constitute (or could constitute) a single cluster, respectively labelled X and Y, as indicated.

The dangers of adding together, to produce a single cluster, a number of clusters found to have some similarity and overlap of traits are now graphically evident. For if A, B and C were consecutively overlapping clusters (as they would be if the angle of each were extended



by a trifle), i.e., if three researches gave three clusters such that A had something in common with B, and B seemed psychologically to resemble C, some of the traits in C could actually have zero and negative correlations with those in A (i.e., be separated by more than a right angle in the diagram). With data in three or more dimensions (as most personality data seem to be) so ready a transition into negative rela-

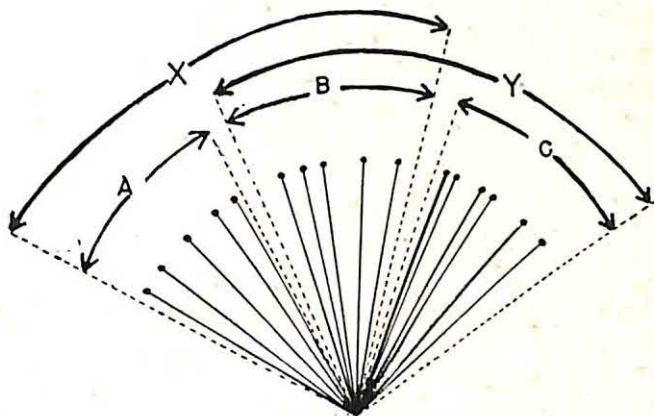


DIAGRAM II

tions is less likely, but it is obvious that the following precautions need to be observed.

1. Put together only clusters having a substantial common trait population.
2. Be prepared to meet situations in which there is actually no natural boundary and in which separate clusters are artificially created by the limits of correlation adopted for clusters, i.e. in which a concatenation of clusters is carved out of a continuum of traits.
3. If such a cluster concatenation is allowed to make a single 'sector,' under a single label, one must recognize that clusters at the beginning of the sector may actually have negative correlations with those at the end. In such circumstances it is best to find some natural cleavage point, however slight, at which the chain of clusters can be split to give sectors in each of which all clusters are positively inter-related. Thus sector A in the chart has been split into AA, AB and AC, though actually nuclear cluster AA1 still seems to have some positive correlation with AC2. Without these breaks the range would, however, be considerable, for AA1 has to do with conscientiousness and good character integration, whereas AC2 has to do with freedom from a kind of temperamental schizoid imbalance.

## II. PRINCIPLES IN COLLATING RESULTS FROM DIVERSE RESEARCHES

Correlation clusters have been established, by various researches to date, with respect to individual differences in terms of 1. Ratings by observers, 2. Self-ratings in questionnaires, 3. Test performances. The present inquiry is confined to data of the first kind; for personality



tests are in their earliest irresponsible infancy, while the data from questionnaires, though of interest in itself, are different in meaning and validity from that obtained through outside, objective observations of behavior. Moreover, only through rating traits by skilled observers are we able at present to cover comprehensively the truly important aspects of behavior, as observed in actual social settings and over adequate samples of time. Pure rating observations, it is true, must in the end be regarded only as a builder's scaffolding, marking out the main patterns of personality in a preliminary fashion. The more exact structure of personality patterns will need to be established within this framework, with the slow growth of actual personality tests and measurements. But at present the assessments of trained judges constitute the best and most comprehensive source of data.

Our review of published (and some unpublished thesis material) research on personality clusters resulted in some 131 putative clusters being set out for comparison. Paired comparisons were made in every possible way and clusters showing considerable overlap were thrown together. In two extensive sets of cluster data, namely, those of the Harvard Psychological Clinic (10, 17) and those of the present writer (6), the classification of the clusters by inspection of their content could be checked upon by the results of further research showing the intercorrelations of the clusters themselves.

The classification and cataloguing of clusters could not be carried out with the certainty of a mechanical rule, however, because of the necessity of incorporating in the psychological judgment the following qualifying circumstances, and these should be kept in mind in appraising the results.

1. Different investigators have used different correlation standards for admission of traits to clusters. The variabilities are not great (0.4 to 0.6) and one may note that even if the same numerical standards had been adopted the situation would not be improved, for differing variabilities of groups, reliabilities of estimate etc. would normally cause one and the same cluster to have different mean intercorrelation in different researches. It seems better rather to aim at investigators getting about the same percentage of clustering traits.

2. Some have taken rather atypical groups, or groups limited in personality variety, e.g. graduate students or college faculties, and have thus found esoteric clusters not present in the general population, while missing more fundamental patterns of human nature. However, the striking thing in these instances is that the majority of clusters found are nevertheless the same.

3. The populations have been of very different ages. Ideally a presentation of empirical clusters would employ parallel charts, one for each age level, since it is likely on general clinical grounds that the form and constitution of clusters would change with age. Similar separations would need to be made with respect to population sampling by social class, intelligence etc. But such refinements are inappropriate to the scantiness of present data, and we aim first to establish the patterns which persist over most settings of human nature and most ages.



That clusters retain recognizable identity over critical age and sex transitions is shown by Tryon's observations (19) with boys and girls of different ages and by Sanford's and Horn's data (10, 17) on children and university students, as well as by the close similarity of many of Sanford's clusters for children and the present writer's clusters for mature adults. Tryon found the following type of cluster modification with age and sex.

	Boys 12 years	Boys 15 years	Boys 15 years	Girls 15 years
Traits falling in cluster	Daring	Daring	Restless	Restless
	Leader	Leader	Talkative	Talkative
	Active in games	Active in games	Attention getting	Attention getting
	Friendly	Fights		Bossy Fights
	(Nuclear Cluster CB1-2 on chart)		(Nuclear Cluster CA1 on chart)	

4. Different trait lists (trait populations) have been used out of which to establish clusters. Clusters, or parts of clusters, are missing from some researches for no more mysterious reason than that no grist has been available for their making. Here too one meets the difficulties arising from the use of different but synonymous terms or of the same terms somewhat differently. For example, *Good Follower* in AA11 (McCloy) seems to be the same as *Loyal* in AA14 (Cattell), while *Leading* in CA53 (Cattell) becomes *Desire to Impose Will on Others* in CA51 (McCloy), *Need Dominance* in CA54 (Sanford-Murray) and *Leader* in CA52 (Williams). Two particularly ambiguous terms are aggressive (sometimes pugnacity, sometimes assertion) and sympathy (sometimes kindness, sometimes sensitive responsiveness).

This is the most serious and the least instructive of divergences in cluster definition. There is a need for more standardized, comprehensive trait lists and for definition of traits by bipolar opposite pairs of terms. Regarding the latter it is interesting to note that in cluster classification a syndrome which was not recognized in one form was often recognized easily in its obverse form, indicating the practical value of *bipolar definition*.

The trait population problem reaches its climax in dealing with those researches in which the investigator has been interested only in one pet cluster and has packed the original list with traits likely to fall in or near this cluster, while neglecting to take bearings on a sufficient number of other important points of the behavior compass.

For the above reasons it seems requisite to discuss briefly the solution adopted here in finally recording the agreed cluster nucleus traits. They have been uniformly translated into terms from the standard 171 item bipolar trait list prepared by condensation (6) from the list of all personality trait terms in the English language, which Allport and Odbert (2) have so skilfully garnered. These 171 terms offer a kind of 'Basic English' for personality research, for they can be shown to include all terms used in previous personality researches (or an effective synonym thereof) as well as able to represent the favored technical expressions of most special schools. A fuller discussion of this basic trait list is given at the head of the cluster chart.



By reason of the sources of variation just described phenomenal clusters in different researches which might otherwise have been identical showed certain divergences. These divergences could themselves be studied to throw light on the essential nature of the nuclear cluster, but at this stage we concentrated on discovering the nuclear cluster itself, putting together for this purpose all phenomenal clusters which had two or more traits in common, which had the same psychological character as wholes and which were known to correlate highly with one another. A *nuclear cluster* was then constructed and defined by the traits common to the phenomenal clusters. Although the temptation to record results most economically, by listing nuclear clusters only, is great, it has seemed best to make this review adequate and unbiased by listing also the phenomenal clusters. Not only does this save the data from possible errors of interpretation but also it provides stimulus for studying the effect of sample on cluster form as well as material for building up more exhaustive lists of related traits as a basis for further research in the region concerned.

Although perhaps four-fifths of the phenomenal clusters converge naturally on certain nuclei, instances occur in which it is difficult to place a cluster bridging two nuclei, either because it is so broad as to include both or because the nuclei are indistinct and pass over without a break one into another. (Between B3 and B4, for example, it is difficult to draw a line.) Throughout, nuclei which resemble each other have been placed in immediate contiguity, so that revisions of boundaries may be readily made in the light of later research. Naturally, by lowering the standard of cluster intra-correlation, broader clusters can always be found to bridge even clearly distinct nuclei.

Just as phenomenal clusters merge in nuclear clusters so do the latter form natural groupings in what have been called *sectors*—to indicate their relation to the personality sphere concept, i.e., they are regions of the surface of the multidimensional personality sphere. The nuclear clusters and their fringes, however, only overlap slightly and in respect to the most general qualities, so that a nuclear cluster at one boundary of the sector may differ very distinctly from that at the opposite boundary. (This was discussed as a logical possibility, in relation to Diagram II.) Eighteen out of the twenty sectors were naturally bounded constellations of nuclear clusters, not so wide that any distinct difference of quality arose between the opposite boundary clusters of any one of them. But two regions, A and C, extended more than could be tolerated on logical grounds. The former, as indicated in another connection, began with character trustworthiness and finished with something nearer temperamental stability. The latter began with straight self assertiveness and ended with insecure self defensiveness



with distinct maladjustment. In these cases relatively faint natural dividing lines were found, so that the unduly large A sector was split into AA, AB and AC, and the C sector into sectors CA and CB partly on logical grounds. No data are available to indicate definitely the width of the typical sector, but from indirect evidence one may estimate that it is about  $75^\circ$ , corresponding to an  $r$  of about 0.26 between the least correlated nuclear clusters.

The scheme of representation and conceptualization at this stage has to be a fairly elastic one. The situation is remarkably similar to that faced by astronomers a generation ago in mapping stellar distributions. To maintain perspective, and to accommodate to peculiarities of the distribution are the major objectives. The notions of sector, cluster nucleus and phenomenal cluster seem to help approach these objectives. Naturally there will be big quantitative variations. Some sectors contain many nuclei, others, as yet, only one or two. In some, e.g., the F region, the nuclei are very closely packed, in others highly discrete and disparate.

The sectors, like the nuclei, have been arranged so that those with the closest resemblance are in immediate contiguity and labelled by consecutive letters of the alphabet. From the 'character' qualities of AB, AA there is transition to the 'realism-emotional integration' of AC and so, through the thence to the 'balance-frankness-optimism' of AC and so, through the truly borderline cluster B1, to the purely intelligence-rooted qualities of B. (The frequency with which intelligence and character integration are found to correlate in general research would lead us to expect such a smooth bridge here.) Similarly the 'daring and social boldness' of CB pass, with a barely perceptible break in the cluster quality, into the pure 'sociability and friendliness' of D. A really clear continuity is indicated by a master letter spreading over the sectors concerned, as on AA, AB and AC.

It is noticeable that where sectors make contact (as by some cluster which could almost equally be in either) the transition cluster bridges not only in one direction but in several. Thus G1 (Austerity-Thoughtfulness-Stability) grades not only into AA1 (Self-control-Loyalty-Fairmindedness-Reliability) but also into B2 (Gentlemanly, Disciplined Thoughtfulness) and into E3 (Deliberateness-Seriousness-Reserve). Also there are linkages other than at the boundaries of sectors, breaking the apparent continuity of regions, notably through the obvious psychological cousinship of CA3 and F6, of CA1 and E1 and of AC2, D5 and F7. In short it is not possible, in other than a rough manner, to arrange sectors in a linear continuum or even in the richer relationships permitted by the two-dimensional continuum of the surface of a sphere. The nature and relationships of clusters are such that the nuclei can



only be represented in a multidimensional space, as the hypothesis of the trait sphere (6) has always required and as the findings of factor analysis (which deals with the same material as cluster studies) demonstrate.

### III. THE CONSTRUCTION OF A CHART OF PERSONALITY CLUSTERS

The exhaustive inter-comparison of 131 phenomenal clusters, as described above, led to the formation of 50 nuclear clusters, falling into 20 personality sectors, but with the majority falling in the first ten sectors. The roundness of these numbers is purely fortuitous and later research may modify the number of nuclear clusters if not the number of sectors.

The present aim has been not only to chart and systematize clusters but to make the classification such that it will form a convenient framework for the addition of fresh material and permit of continuous adaptive growth. A first requisite for this aim is that one avoid the prejudiced interpretation and classification which would come from affixing names, especially interpretive names, to the nuclei and sectors. As the ensuing discussion indicates, many of these clusters are clearly old friends from the clinic, the classroom, or the laboratory, such as the syndromes of paranoia, neuroticism, somatonia, cyclothymia, extraversion, dominance, etc. The temptation to leap to an interpretive label of this kind is considerable, because it is briefer, more colorful and seemingly more technical than a collection of literal trait terms. But it is highly desirable to separate clearly the descriptive and the interpretative steps of personality research and the present project deals with the description of personality only. For, in the opinion of the writer, the too facile and premature interpretation which has prevailed in this field has aborted the enterprise of exact observation. It has left psychology with a set of popular syndrome concepts, such as extraversion, dominance, neuroticism and cyclothymia, so battered and warped by the superficial interpretations of the market place that they might as well be thrown away.

The general structure of cluster and sector is such that the notation which suggests itself as most practicable is something akin to the Dewey decimal system of library classification, fitted to permit constant growth. Instead of using numbers throughout, however, it seemed best to indicate the sector by a letter, since sectors, of which we probably already have most recorded, are not likely to extend beyond the alphabet. (Usually a single letter is used, but sectors within a major region are indicated by two, as in AA, AB and AC.) The nuclear cluster is identified by a number within a sector, thus, D1, D2, D3, etc., and the actual, historical, phenomenal clusters by an additional decimal point,



thus, D1.1, D1.2, etc., indicating the clusters converging on the nucleus D1. The order of these clusters within the nuclear group is a chance arrangement, there being no point, except perhaps historical order of discovery, in any other. Each phenomenal cluster is labelled further by the name of its discoverer, thus, *D5.1 Tryon.*, to facilitate reference to the original research and conditions of its isolation. The phenomenal clusters isolated by the present writer and published in a recent research, which are more numerous than others and need further identification, have in addition a number in brackets giving their index number in the list there published.

Each sector and cluster nucleus indexed in the manner just described is also defined by a triplet of terms aimed at maximum literal description of the behavior concerned in that region. Although the writer believes adjectival trait terms are better, these traits are given in noun form to follow general practice, which has favored hypostatizations. But the actual list of traits by which the nucleus is eventually anchored is set out in adjective form immediately below the title.

The terms in which this final nuclear definition of all traits that have appeared in the various phenomenal clusters is expressed are from the standard 'basic list' of 171 trait terms already described. The reasons for putting weight on this trait particular list and its constructs in our final summary, rather than on the trait material of other researches here listed, are as follows.

1. It covers all trait terms, including those in various specialized systems.
2. The terms are themselves standard dictionary terms, having widely understood meanings, widely stabilized in language.
3. There is a more considerable literature of clusters already in this trait system than in any other, and of clusters, moreover, with the following special utilities (a) they are based on a more typical, adult population than most, (b) they are unbiased, being based on purely "blind" mathematical treatment of variables, (c) the structural relationships among the clusters are systematically known through further intercorrelation studies on clusters.
4. The traits are in terms of polar opposite pairs.

It is worthy of note, in regard to the utility of such a list, that the 69 clusters found by research on the 171 traits involved (6) cover decidedly more sectors of personality than are subtended by other cluster researches, and open up regions of type and syndrome description not previously suspected, actually increasing the number of sectors from 11 to 20. At the same time all of the older 11 sectors are confirmed, and indeed 28 of the original 31 nuclei within these sectors, based on all previous researches, are rediscovered in the one research on this wider trait foundation, while 19 new cluster nuclei are added. Considered theoretically, as well as in the light of these results, it is evident that the basing of the cluster spacing on the foundation of the personality



sphere trait list offers the chief guarantee that the cluster chart truly depicts the proportions and perspectives of "personality space."

To guide any preliminary interpretation that may be attempted regarding the developmental or other relationships between the actual phenomenal clusters of different researches, within the cluster nucleus, particulars of the research methods and population samples involved in the various researches are set out briefly.

\*ACKERSON, L. (1). 1000 girls and 2000 boys, 6-16 yrs. Traits checked present or absent on basis of extensive clinical and social records.

CATTELL, R. B. (Temperament research (4)). 62 male college students. Rated by fellows in residence. 48 traits, mainly temperamental, some character.

CATTELL, R. B. (6). 100 mature adults, in varied occupations. Each rated by two associates. 171 traits, in comprehensive 'basic trait list.'

FLEMMING, E. G. (9). 71 high school girls, all, in some degree, leaders. Ratings by teachers and by coevals. 46 varied traits.

\*JONES, E. S. (11). 145 men business executives and teachers. Rated by associates. Brief but comprehensive trait list.

MASLOW, A. H. (12, 13). 60 women college students. Rated at interview, after selection by questionnaire as to presence or absence of traits.

MAURER, K. M. (14). 50 children of 4-6 yrs. Traits checked present or absent by one judge (woman) to each child. Child chosen by judge. 50 traits, reduced from very wide dictionary list.

MCCLOY, C. H. (15). 31 college students. Rated by one another. 43 traits, largely characterial. Also re-analysed Webb's data on 200 students.

\*OLINICK, S. L. (16). 60 adults, mainly professional class. Traits checked present or absent, by an intimate acquaintance of each. 173 traits, chosen from Allport-Odbert list.

SANFORD, R. N. (17). Labelled *Sanford-Murray* in chart, because Sanford established clusters in terms of Murray's trait list and concepts. 43 boys and girls, 5-14 years. Rated by adult judges, over period of three years. 45 traits, 34 of which were purely ergic in character.

SANFORD-HORN-MURRAY. In Horn D. (10). Extension of Sanford-Murray enquiry to college students, establishing four of Sanford's twenty clusters essentially in same terms for adults. 28 university students. Rated by several judges, in clinical study. 11 traits, from Sanford-Murray list.

SHELDON, W. (18). 33 students and faculty. Rated by one judge. 50 traits clinically sifted from 650 in temperament field. Repeated with 100 students, conditions of rating not stated, to fix intra-cluster relationship of variables.

TRYON, C. M. (19). 170 12 year old boys, 170 12 year old girls, 169 15 year old boys, 181 15 year old girls. Rated by class mates. 18 traits, of varied character.

WILLIAMS, H. M. (20). 53 three year old children. Rated by experienced adult judges. 30 traits, taken from Berne Scale.

\* These three studies are not strictly cluster studies, but are included because the data have such special virtue that it was considered worth while to approximate to the clusters in it by rough manipulations of the given correlations, rather than discard the data. In each we are given a set of traits which correlate highly with one particular trait, without proof that they correlate highly among themselves. Ackerson's comprehensive work is particularly valuable because it deals with recorded behavior (according to clinic and police and social worker) of really adequate numbers of children and gives such extensive intercorrelation lists that the cluster formation can be almost completely determined.



IV. CHART OF PERSONALITY CLUSTERS AND SECTORS

REGION A.

CHARACTER-PERSONALITY INTEGRATION OR DEVELOPMENT

v.

MORAL CHARACTER DEFECT, NEUROSIS, PSYCHOSIS

1. SECTOR AA. FINENESS OF CHARACTER

v.

MORAL DEFECT, NON-PERSISTENCE

*Nuclear Cluster AA1.*

Integrity, Altruism

v.

Dishonesty, Undependability

*Nuclear Traits*

Honest—Dishonest  
Self Controlled  
Self Denying—Selfish  
Loyal—Fickle  
Fair-minded—Partial  
Reliable—Undependable

*Nuclear Cluster AA2.*

Conscientious Effort

v.

Quitting, Inconherence

*Nuclear Traits*

Persevering—Quitting  
Pedantic (Orderly)—Disorderly  
Painstaking—Slipshod  
Conscientious—Conscienceless  
Thoughtful—Unreflective

*Overlapping phenomenal clusters in AA1.*

*AA11. McCloy*

Integrity (Having), Good Follower, Fair, Characterful, Self-Denying, Trustworthy. (And other traits described as "passive but constructive virtues.")

*AA12. Flemming*

Fair, Good Judgment, Honest, Idealistic, Intelligent, Understanding.

*AA13. Cattell (39)*

Stable Emotionally—Changeable  
Thoughtful—Unreflective  
Self-Respecting—  
Self-Controlled—  
Reliable—Undependable  
—Suggestible  
(Practical—Unrealistic)

*AA14. Cattell (40)*

Dishonest—Honest  
Fickle—Loyal  
Infantile—Mature

*Overlapping phenomenal clusters in AA2.*

*AA21. Cattell (13)*

Clear Thinking—Incoherent  
Persevering—Quitting  
Independent—Dependent  
Painstaking—Slipshod  
Conscientious—Conscienceless

*AA22. Sanford-Murray*

Need Blamavoidance, Need Order, Deliberation, Conjunctivity, Endurance, Need Achievement, Need Counteraction, Need Understanding, Need Construction. (Called "Conscientious Effort").

*AA23. Olinick*

Conscientious, Courteous, Neat, Thoughtful, Aggressive, Practical, Earnest.



*AA1-2. Flemming.*

This extends over AA1 and AA2.  
Dependable, Industrious, Loyal, Modest, Neat,  
Sincere, Tolerant, Unselfish.

## 2. SECTOR AB. REALISM, EMOTIONAL INTEGRATION

v.

## NEUROTICISM, EVASION, INFANTILISM

*Nuclear Cluster AB1.*

Realism, Reliability

v.

Neuroticism, Changeability

*Nuclear Traits*

Practical—Unrealistic

Reliable—Undependable

—Neurotic

Placid—Worrying

Loyal—Fickle

*Overlapping phenomenal clusters in AB1.**AB11. Cattell (21).*

Practical—Unrealistic

Reliable—Undependable

—Neurotic

Self-Controlled—

Loyal—Fickle.

*AB12. Cattell (53)*

Unrealistic—Practical

Quitting—Persevering

Suggestible—

Undependable—Reliable

Subjective—Guided by Reality.

*AB13. Ackerson*

Overlaps also with AB2.

Sensitive, Worrisome, Depressed, Changeable,  
Finicky Food Habits, Lacking Initiative, Nervous  
Symptoms, Bossy, Inferiority Feelings,  
Spoiled Child.

*Nuclear Cluster AB2.*

Practicalness, Determination

v.

Daydreaming, Evasiveness

*Nuclear Traits*

—Self-Deceiving

Facing Life—Evasive

Decisive—Dubitative

Enterprising—Shiftless

Phantasying

*Overlapping phenomenal clusters in AB2.**AB21. Cattell (12)*

Self-Deceiving—

Evasive—Facing Life

Unrealistic—Practical

Dubitative—Decisive

Acquisitive—

*AB22. McCloy*

Aggressive, Initiative (Having), Conviction  
(Having), Decisiveness (Having).

*AB2-3.1 Ackerson*

A cluster overlapping AB2 and AB3.  
Daydreaming, Masturbation, Depression, Fant-  
tastic Lying, "Queer" Behavior, Absent Minded,  
Irresponsible, Inferiority Feelings.



*Nuclear Cluster AB3.*

Neuroticism, Self-Deception,  
Emotional Intemperateness  
v.

*Nuclear Traits*

Self-Deceiving—  
Neurotic—  
Hypochondriacal—  
Depressed—Cheerful  
Emotionally Intemper-  
ated—Balanced  
Absent Minded—Alert

*Nuclear Cluster AB4.*

Infantile, Demanding,  
Self-Centeredness  
v.

Emotional Maturity, Frustration  
Tolerance

*Overlapping phenomenal clusters in AB3.*

AB31. Cattell (8)

Self-Deceiving—  
Hypochondriacal—  
Neurotic—  
Plaintive—  
Self-Pitying—  
Extreme—Temperate  
(Emotionally intemperate)

*Overlapping phenomenal clusters in AB4.*

AB41. Cattell (38)

Infantile—Mature (Emotionally)  
Hypochondriacal—  
Self-Pitying—  
Exhibitionist—Self-Effacing.  
Unself-Controlled—Self-Controlled

AB-C.1 Ackerson's

"Personality Total" extends through AB2,  
AB3, AB4, AC1 and AC2.  
Incipient Psychosis, Defective Conduct Total,  
"Queer," Depressed, Contrary, Jealousy of Sibs,  
Worrisome, Inferiority Feelings, Etc.

3. SECTOR AC. BALANCE, FRANKNESS, OPTIMISM

v.

MELANCHOLY, AGITATION

*Nuclear Cluster AC1.*

Agitation, Melancholy, Obstinacy  
v.

Placidity, Social Interest

*Nuclear Traits*

Depressed—Cheerful  
Hypochondriacal—  
Worrying—Placid  
Habit-Bound—Labile  
Sensitive—Tough  
Seclusive—Sociable

*Nuclear Cluster AC2.*

Balance, Frankness,  
Sportsmanship  
v.

Pessimism, Secretiveness,  
Immoderateness

*Nuclear Traits*

Frank—Secretive  
Generous—Tight-Fisted  
Temperate—Emotionally Ex-  
treme (schizoid)  
Easy Going—

*Overlapping phenomenal clusters in AC1.*

AC11. Cattell (56)

Self-Pitying—  
Hypochondriacal—  
Pessimistic—Optimistic  
Worrying—Placid  
(Habit-Bound—Labile)

AC12. Ackerson

Depressed, Crying, Sensitive and Worrisome,  
Psycho-neurotic, Daydreaming, Hatred, Jealousy  
of Sibling, Changeable Moods, Seclusive.

*Overlapping phenomenal clusters in AC2.*

AC21. Cattell (Temperament Research)

Emotionally Balanced, Temperate—Extreme  
Frank—Secretive  
Optimistic—Pessimistic  
Generous—Tight-Fisted

AC22. Flemming

Frank, Generous, Good Natured, Good Sport,  
Natural, Unaffected.



## 4. SECTOR B. INTELLIGENCE, DISCIPLINED MIND, INDEPENDENCE

v.

## FOOLISH, UNDEPENDABLE UNREFLECTIVENESS

*Nuclear Cluster B1.*Emotional Maturity,  
Clarity of Mind

v.

Infantilism, Dependence

*Nuclear Traits*

(As in B11 opposite)

*Nuclear Cluster B2.*Gentlemanly, Disciplined  
Thoughtfulness

v.

Extraverted, Foolish,  
Lack of Will*Nuclear Traits*

Thoughtful—Unreflective

Wise—Foolish

Persevering—Quitting

Austere—Profligate

Polished—Rough

*Overlapping phenomenal clusters in B1.**B11. Cattell (6)*

Mature—Infantile

Clear Thinking—Incoherent

Independent—Dependent

Spatial, Visual Thinking Ability

—Neurotic

Reliable—Undependable

*Overlapping phenomenal clusters in B2.**B21. Sanford-Murray*Need Counteraction, Endocathection. (Called  
"Counteractive Endocathection.")*B22. Cattell (5)*

Thoughtful—Unreflective

Wise—Foolish

Austere—Profligate

Independent—Dependent

Polished—Rough

Reliable—Undependable

*B23. Cattell (15)*

Thoughtful—Unreflective

Theoretical Interests—

Logical Ability, Reasoning—

Planful—Planless

Wise—Foolish

—Suggestible

*B24. Cattell (16)*

Thoughtful—Unreflective

Polished—Rough

Analytical—

Interests Wide—Interests Narrow

Sophisticated—Simple-Hearted

*Overlapping phenomenal clusters in B3.**B31. Cattell (2)*

Original—Banal

Interests Wide—Interests Narrow

Versatile—

Independent—Dependent

Constructive—

Intelligent—

*B32. Sanford-Murray*Creativity, Endurance, Need Counteraction,  
Need Order, Need Construction (Called "Or-  
derly Production.")*Nuclear Cluster B3.*Creativity, Self-Determination,  
Intelligence

v.

Narrowness of Interests,  
Fogginess*Nuclear Traits*

Original—Banal

Constructive—

Interests Wide—Interests Narrow

Independent—Dependent

Persevering—Quitting

Intelligent—



*Nuclear Cluster B4.*

Intelligence, Penetration,  
General Talent  
v.  
Lack of 'g'

*Nuclear Traits*

As in B41.

*Overlapping phenomenal clusters in B4.*

*B41. Cattell (3)*

Intelligent, Clear Thinking, Logical Ability,  
Reasoning, Clever, Spatial-Visual Ability,  
Mathematical Ability, Analytical.

*B3-4.1. Flemming*

Cluster extending over B3 and B4.

Clever, Cultured, Original, Talented, Well In-  
formed, Wide Interests.

REGION C.

SELF-ASSERTION, VENTURESOMENESS, CLAMOROUSNESS

v.

GENERAL INHIBITION, MODESTY, TIMIDITY

5. SECTOR CA. EGOTISM, ASSERTION, STUBBORNNESS

v.

MODESTY, SELF-EFFACEMENT, ADAPTABILITY

*Nuclear Cluster CA1.*

Crude Social Assertion,  
Exhibitionism  
v.

Modesty, Obedience to Authority

*Nuclear Traits*

Exhibitionist—Self-Effacing  
Argumentative—  
Talkative—Taciturn  
Boastful—Modest  
Arrogant—Humble

*Overlapping phenomenal clusters in CA1.*

*CA11. Tryon*

Restless, Talkative, Attention Getting (Bossy),  
(Fights), (Unkempt)

*CA12. Sanford-Murray*

Need Blamavoidance, Need Deference. (Called  
"Willing Obedience.")

*CA13. Cattell (1)*

Arrogant—Humble  
Exhibitionist—Self-Effacing  
Conceited—Self-Dissatisfied  
Headstrong—Gentle Tempered  
Argumentative—  
Assertive—Submissive  
Autocratic—  
Boastful—Modest

*CA14. Cattell (4)*

Exhibitionist—Self-Effacing  
Treacherous—  
Extrapunitive—Praiseful  
Talkative—Taciturn  
Argumentative—  
Boastful—Modest

*CA1-2.1. Maurer*

Cluster overlapping CA1 and CA2 and some CA3  
Talkative, Domineering, High Strung, Forward,  
Active, Persistent, Obstinate, Noisy, Independ-  
ent, Plucky



*Nuclear Cluster CA2.*

Stubbornness, Pugnacity,  
Clamorousness

v.

Tolerance, Self-Effacement

*Nuclear Traits*

Extrapunitive—Praiseful  
Pugnacious—Peaceable  
Self-Pitying—  
Mulish—Reasonable

*Nuclear Cluster CA3.*

Rigidity, Despotism, Egotism

v.

Adaptability, Friendliness,  
Tactfulness

*Nuclear Traits*

Inflexible—Adaptable  
Extrapunitive—Praiseful  
Tactless—Tactful  
Hostile—Friendly  
Ruthless—Kind  
Defensive—  
Acquisitive—  
(Infantile—Mature)

*Nuclear Cluster CA4.*

Shrewd, Dictatorialness

v.

Naive, Unassertiveness

*Nuclear Traits*

As in CA41 opposite.

*Overlapping phenomenal clusters in CA2.**CA21. Sanford-Murray*

Need Defenceance, Need Rejection, Need Autonomy, Need Blamescape, Need Aggression, Need Retention, Need Acquisition, Need Dominance, Projectivity. (Called "Aggressive Self-Defence.")

*CA22. Cattell (34)*

Extra-punitive—Praiseful  
Opinionated—Tolerant  
Pugnacious—Peaceable  
Self-Pitying—  
Exhibitionist—Self-Effacing  
Mulish—Reasonable

*Overlapping phenomenal clusters in CA3.**CA31. Cattell (27)*

Inflexible—Adaptable  
Extrapunitive—Praiseful  
Hostile—Friendly  
Opinionated—Tolerant  
Egotistic—Altocentric  
Flattering

*CA32. Flemming*

Adaptable, Considerate, Not Easily Excited,  
Pleasant Voice, Sympathetic, Tactful.

*CA33. Cattell (10)*

Extrapunitive—Praiseful  
Treacherous—  
Acquisitive—  
Thankless—Grateful  
Defensive—

*CA34. Sanford-Murray*

Need Blamavoidance, Need Abasement. (Called "Guilt and Remorse.")

*CA35. Cattell (Temperament Research)*

Mature (Emotionally)—Infantile  
Kind on Principle—  
Good-Natured—  
Tactful—Tactless

*Overlapping phenomenal clusters in CA4.**CA41. Cattell (47)*

Autocratic—  
Shrewd—Naive  
Boastful—Modest  
Assertive—Submissive  
(Austere—Profligate)



*Nuclear Cluster CA5.*

Assertion, Rivalry, Conceit  
v.  
Modesty, Unassumingness

*Nuclear Traits*

Leading—  
Conceited—Self-Dissatisfied  
Assertive—Submissive  
Autocratic—  
Self-Confident—Self-Distrusting  
Exhibitionist—Self-Effacing

*Nuclear Cluster CA6.*

Eager, Self-Assertion  
v.  
Lack of Ambition

*Overlapping phenomenal clusters in CA5.*

*CA51. McCloy*

Eagerness for admiration, Self-Esteem (Conceit),  
Desire to Impose Will on Others.

*CA52. Williams*

Ascendant, Rivalrous, Leader, Independent of  
Adults.

*CA53. Cattell (32)*

Conceited—Self-Dissatisfied  
Leading—  
Boastful—Modest  
Self-Confident—Self-Distrusting  
(Headstrong—Gentle-Tempered)  
(Hurried—Lethargic)

*CA54. Sanford-Murray*

Need Dominance, Need Aggression, Need Ac-  
quisition, Need Autonomy, Need Recognition,  
Need Cognizance, Need Defendance, Need Ex-  
hibition, Need Excitance, Intensity. (Called  
"Ascendance.")

*Overlapping phenomenal clusters in CA6*

*CA61. Sanford-Murray*

(There are insufficient elements in this cluster to  
locate it with confidence. It seems most likely an  
appendage of the CA sector.) Need Achievement,  
Intensity. (Called "Undisciplined Achievement.")

6. SECTOR CB. BOLDNESS, INDEPENDENCE, TOUGHNESS

v.

TIMIDITY, INHIBITION, SENSITIVITY

*Nuclear Cluster CB1.*

Energy, Boldness, Spiritedness  
v.  
Apathy, Timidity, Languor

*Nuclear Traits*

Energetic, Spirited—Languid  
Enthusiastic—Apathetic  
Alert—Absent-Minded  
Debonnaire  
(Strong Personality— )  
(Quick—Slow)  
(Bold—Timid)  
(Independent—Dependent)

*Clusters extending over  
CB1 and CB2*

*Overlapping phenomenal clusters in CB1.*

*CB11. Cattell (33)*

Energetic Spirited—Languid  
Self-Confident—Self-Distrusting  
Enthusiastic—Apathetic  
Independent—Dependent  
(Physical Activity Interests)  
(Debonnaire— )

*CB12. Sanford-Murray*

Need Passivity, Need Harmavoidance. (Called  
"Passive Timidity.")

*CB13. Cattell (44)*

Alert—Absent-Minded  
Energetic, Spirited—Languid  
Quick—Slow  
Strong in Personality—



*CB14. Cattell (28)*

Energetic, Spirited—Languid  
 Vivacious—  
 Assertive—Submissive  
 Hearty—Quiet  
 Debonnaire—

*CB1-2.1. Sheldon (Somatotonia)*

Assertive, Dominating, Competitive, Energetic,  
 Adventurous, Bold, Courageous, Not Sensitive,  
 Unrestrained, Noisy, "General extravert qualities."

*CB1-2.2. Tryon*

Daring, Leader, Active in Games (Friendly),  
 (Fights), (Humor about jokes).

*CB1-2.3. Olinick*

Independent, Proud, Active, Sociable, Leader,  
 Adventurous

*Nuclear Cluster CB2.*

Independence, Cleverness,  
 Confidence

v.

Timidity, Dependence,  
 Languidness

*Nuclear Traits*

Independent—Dependent

Clever—

Versatile (Technical aptitudes)

Self-Confident—Self-Distrusting

Alert—Absent-Minded

Energetic, Spirited—Languid

*Overlapping phenomenal clusters in CB2.**CB21. Cattell (26)*

Independent—Dependent

Technical Interests—

Mechanical Aptitude—

Versatile—

Self-Confident—Self-Distrusting

*CB22. Sanford-Murray*

Need Succorance, Need Harmavoidance, Pro-  
 jectivity. (Called "Timid Dependence.")

*CB23. Cattell (43)**(Bridges clusters CB1 and CB2)*

Independent—Dependent

Clever—

Alert—Absent-minded

Energetic Spirited—Languid

(Adventurous—Timid)

(Quick—Slow)

*Overlapping phenomenal clusters in CB3.**CB31. Ackerson*

Bashful, Apprehensive, Lack of Initiative, Seclu-  
 sive, Inferiority Feelings, Follower, Irregular  
 Sleep, Listless, Sensitive and Worrisome

*CB32. Sanford-Murray*

Need Infavoidance, Need Harmavoidance, Anx-  
 iety. (Called "Timid Withdrawal.")

*CB33. Cattell (46)*

Inhibited (in general)—Incontinent

Timid—Adventurous

—Gluttonous

Submissive—Assertive

(Unenquiring—Curious)

*Nuclear Cluster CB3.*

Lack of Restraint, Adventurousness

v.

General Inhibition, Fearfulness

*Nuclear Traits*

Timid—Bold

Shiftless—Enterprising

Submissive—Assertive

Worrying—Placid

Shy—Sociable I (Forward)

Inhibited—Incontinent



*Nuclear Cluster CB4.*

Poised Sociability, Inertia,  
Toughness

v.

Introspectiveness, Sensitivity,  
Haste

*Nuclear Traits*

Tough—Sensitive

Lethargic—Hurried

Poised—Awkward

—Introspective

Sociable—Shy

Relaxed—High Strung

(Slow—Quick)

(Easy going—Short tempered)

(Clear thinking—Incoherent)

*Overlapping phenomenal clusters in CB4.*

CB41. Sheldon (Cerebrotonia)

Mental Overintensity, Fast Reactions, Inhibited,  
Shy, Not Sociable, Poor Sleep, Not habit-bound,  
Sensitive, "General introvert qualities."

CB42. McCloy

Cool-Headed, Resourceful, Poised, Self-Controlled, Sociable

CB43. Cattell (60)

Introspective—

Sensitive—Tough

Hurried—Lethargic

(Cautious—Bold)

(Taciturn—Talkative)

*Ill-defined Clusters in this sector.*

CB1-3-4.1. Maslow (Dominance)

A cluster covering most of CB sector, but principally Sector CB3 and CB4. Admixture of traits from A.

Self-Confident, Self-Assured, Socially Poised, Leader, Relaxed, Extroverted, Hypnotizable, High Self-Esteem, Tendency to Use People, Freer Personal Expression, Love of Adventure, and Novelty, Shy and Quiet, Embarrassable, Self-Conscious, Inhibited, Envious, Distrustful, Conventional, Modest, Honest and Reliable, Neat and Prompt, Faithful, Conservative, More Religious, More Polite

CB1-2-4. D.I. Jones, E

A cluster running on into the D sector.

Sympathetic Appreciation of Others' Difficulties, Confidence in Bearing, Cheerful and Optimistic, Energetic, Good Mixer, Clever in Repartee, Fluent.

*Nuclear Cluster CB5.*

Smartness, Assertiveness,  
Independence

v.

Unsophistication, Submissiveness,  
Reverence

*Nuclear Traits*

As in CB51, opposite.

*Overlapping phenomenal cluster in CB5.*

CB51. Cattell (41)

Sophisticated—Simple-Hearted

Independent—Dependent

Intelligent—

Assertive—Submissive

(Impious—Reverent)



## 7. SECTOR D. SOCIABILITY

v.

## TIMIDITY, HOSTILITY, GLOOMINESS

*Nuclear Cluster D1.*Sociability, Adventurousness,  
Heartiness

v.

Shyness, Timidity, Reserve

*Nuclear Traits*Sociable (Forward)—Shy  
Sociable (Gregarious), II—Seclusive  
Adventurous—Timid  
Social Interests—  
Intrusive—Reserved*Nuclear Cluster D2.*Sociability, Sentimentalism,  
Warmth

v.

Independence, Hostility, Aloofness

*Nuclear Traits*Responsive—Aloof  
Affectionate—Frigid  
Sentimental—Hard headed  
Social Interests—  
Home and Family Interests  
Dependent—Independent  
Friendly—Hostile  
Frank—Secretive  
(Genial—Cold-Hearted)  
(Tough—Sensitive)*Overlapping phenomenal clusters in D1.**D11. Cattell (49)*Social Interests—  
Sociable, I—Shy  
Curious—Unenquiring  
Adventurous—Timid  
Intrusive—Reserved*D12. Olinick*Extends beyond this nuclear region, e.g. into CB1  
Sociable, Sympathetic, Active, Independent,  
Economical, Witty, Adventurous*D13. Cattell (51)*Sociable, I—Shy  
Responsive—Aloof  
Social Interests—  
Sociable, II—Seclusive  
Hearty—Quiet  
(Intrusive—Reserved)*Overlapping phenomenal clusters in D2.**D21. Cattell (45)*Responsive—Aloof  
Sentimental—Hard-Headed  
Affectionate—Frigid  
Genial—Cold-Hearted  
—Sour*D22. Olinick*Sensitive, Sincere, Aloof, Independent, Domestic,  
Critical.*D23. Sheldon**(Viscerotonia)*Love of Comfort, Relaxed, Slow, Gregarious,  
Needing Sympathy, Easily Expressed Feelings,  
Even Tempered, Amiable, Social, Personality  
Interests*D24. Cattell (29)*Secretive—Frank  
Aloof—Responsive  
Sadistic—  
Formal—Casual*D25. Cattell (30)*

—Social Interests

Sour—  
Slandorous—  
Brooding—Unrepining  
Aloof—Responsive



*Nuclear Cluster D3.*

Interest in Group Life,  
Liking to Participate

v.

Self-Sufficiency

*Nuclear Traits*

Sociable, II—Seclusive  
Cooperative—Obstructive  
Responsive—Aloof  
Dependent—Independent

*Nuclear Cluster D4.*

Personal Attractiveness,  
Sociability, Pleasure Seeking,  
Frivolity

v.

Earnestness, Asceticism,  
Mirthlessness

*Nuclear Traits*

(Attractive Personal Appearance)  
(Popular—Unpopular)  
Cheerful—Gloomy  
Sociable—Seclusive  
Laughterful—Mirthless  
Mischievous (Playful)—  
Sensuous—Ascetic  
Frivolous—Serious  
(Physical Activity Interests)

*Broad Cluster.*

*Nuclear Cluster D5.*

Cheerful Enthusiastic, Witty

v.

Cold-Hearted, Sour, Mirthless

*D26. Sanford-Murray*

Need Affiliation, Need Nurturance, Need Deference. (Called "Social Feeling.")

*Overlapping phenomenal clusters in D3.*

*D31. Sanford-Murray*

Need Rejection, Need Seclusion, Need Retention. (Called "Self Sufficiency.")

*D32. Williams*

Participating, Cooperative, Interested in Group.

*Overlapping phenomenal clusters in D4.*

*D41. McCloy*

Cheerful, Fond of Large Gatherings, Concentrating on Pleasure

*D42. Tryon*

Popular, Good looking, Friendly, (Enthusiastic) (Humor)

*D43. Flemming*

Athletic, Good Personal Appearance, Beautiful, Smiling, Sociable.

*D44. Sanford-Murray*

Need Sociability, Need Play. (Called "Good Fellowship.")

*D45. Cattell (Temperament research)*

(Surgency—Desurgency)

Cheerful—Gloomy  
Natural—Formal  
Sociable—Unsociable  
Humorous—Earnest  
Adaptable—Conservative

*D1-2-3-4-5. Maurer\**

(Extending over all nuclei of D)

Sociable, Cheerful, Amenable, Responsive, Resourceful, Enthusiastic, Curious, Happy, Frank

*Overlapping phenomenal clusters in D5.*

*D51. Tryon*

Enthusiastic, Happy, Humor about Jokes, (Humor about Self)

\* Note D4 and D5 cannot be fused, for in Tryon's data and again in Cattell's data both clusters appear from the same population of traits. Also, sociability is absent from D5.



*Nuclear Traits*

Cheerful—Gloomy  
 Enthusiastic—Apathetic  
 Optimistic—Pessimistic  
 Laughterful—Mirthless  
 Witty, Humorous—

*D52. Cattell (19)*

Genial—Cold-Hearted  
 Cheerful—Gloomy  
     —Sour  
 Optimistic—Pessimistic  
 Enthusiastic—Apathetic  
 Laughterful—Mirthless

## 8. SECTOR E. GENERAL EMOTIONALITY, HIGH-STRUNGNESS, INSTABILITY

v.

## PLACIDITY, DELIBERATENESS, RESERVE

*Nuclear Cluster E1.**Overlapping phenomenal clusters in E1.*

High Strungness, Impulsiveness,  
 Anxiety

*E11. Cattell (22)*

v.

Excitable—Phlegmatic  
 Highly Strung—Relaxed  
 Hearty—Quiet  
 Hurried—Lethargic  
 Impulsive—Deliberate  
 Vivacious—

Apathy, Relaxation, Deliberateness

*Nuclear Traits*

High Strung—Relaxed  
 Impulsive—Deliberate  
 Hurried—Lethargic  
 Emotional—Unemotional  
 (Worrying—Placid)  
 (Excitable—Phlegmatic)  
 (Vivacious— )

*E12. Cattell (52)*

Highly Strung—Relaxed  
 Hurried—Lethargic  
 Sleeps Poorly—Sleeps Well  
 Impulsive—Deliberate  
 Irritable—Good Tempered

*E13. Sanford-Horn-Murray*

Impulsivity—Deliberateness  
 Projectivity—Objectivity  
 Emotionality—Placidity  
 Intensity—Apathy  
 Disjunctivity—Conjunctivity  
 High Anxiety—Low Anxiety  
 Transience—Endurance  
 (Intracception—Extracception)  
 (Called "Anxious Emotional Expressiveness.")

*Nuclear Cluster E2.**Overlapping phenomenal clusters in E2.*

Sthenic Emotionality, Hypomania,  
 Instability

*E21. Cattell (37)*

v.

Emotional—Unemotional  
 Impulsive—Deliberate  
 Excitable—Phlegmatic  
 Impatient—Patient

Self-Control, Patience, Phlegm

*Nuclear Traits*

Emotional—Unemotional  
 (Hearty—Quiet)  
 Impulsive—Deliberate  
 Irritable—Good-Tempered  
 Unself-controlled—Self-Controlled  
 (Impatient—Patient)

—Self-Controlled  
 (Irritable—Good-Tempered)  
 (Emotional II. (Sthenic Emotionality)— )



*Nuclear Cluster E3.*

Intrusiveness, Frivolity, Neurotic  
Instability

v.

Deliberateness, Seriousness,  
Reserve

*Nuclear Traits*

As in E31, opposite.

*Nuclear Cluster E4.*

Generally Emotional, Dissatisfied,  
Intense

v.

Content, Placid, Temperate

*Nuclear Traits*

Emotional—Unemotional

Impulsive—Deliberate

Extreme—Temperate

Dissatisfied—Contented

(Enthusiastic (ardent)—Apathetic)

*E22. Ackerson*

Emotionally Unstable, Moody, Temper Tantrums,  
Violence, Nervous Symptoms, "Queer" Staying  
Out Late Nights, Object of Teasing, Neurological  
Defect, Encephalitis

*Overlapping phenomenal clusters in E3.*

*E31. Cattell (20)*

Intrusive—Reserved

—Self-Controlled

Impulsive—Deliberate

Frivolous—Serious

Neurotic—

(Self-Pitying— )

(Changeable—Stable Emotionally)

*Overlapping phenomenal clusters in E4.*

*E41. Sanford-Murray*

Need Exhibition, Need Excitement, Need Cogni-  
zance, Need Recognition, Need Sex, Need Suc-  
corance, Need Exposition, Need Blamescape,  
Need Defenceance, Projectivity, Impulsivity,  
Emotionality, Change (Called "Sensation!")

*E42. Sanford-Horn-Murray*

(Impulsivity—Deliberateness)

Change—Sameness

Emotionality—Placidity

Intensity—Apathy

( —Need Passivity)

(Called "Placid Immobility.")

*E43. Cattell (25)*

Extreme—Temperate

Emotional—Unemotional

Dissatisfied—Contented

Alcoholic—

Self-Deceiving—

9. SECTOR F. GRATEFULNESS, FRIENDLINESS, IDEALISM

v.

SADISM, SLANDEROUSNESS, SUSPICIOUSNESS  
(BENIGN CYCLOTHYME v. HOSTILE SCHIZOTHYME)

*Nuclear Cluster F1.*

Gratefulness, Easygoingness,  
Geniality

v.

Hardness, Vindictiveness.  
Cold-Heartedness

*Nuclear Traits*

As in F11 opposite.

*Overlapping phenomenal clusters in F1.*

*F11. Cattell (11)*

Grateful—Thankless

—Slandorous

Soft-Hearted—Hard-Hearted

Unresentful—Vindictive

Easy-Going—Short-Tempered

—Sour

Genial—Cold-Hearted



*Nuclear Cluster F2.*

Gratefulness, Kindness,

Christian Idealism

v.

Hostility, Cynicism,

Selfish Withdrawal

*Nuclear Traits*

Grateful—Thankless

Idealistic—Cynical

Self-Denying—Selfish

Friendly—Hostile

*Overlapping phenomenal clusters in F2.**F2.1 Cattell (54)*

Grateful—Thankless

—Sadistic

Self-denying—Selfish

Kind on Principle—

Unresentful—Vindictive

( —Self-Pitying)

*F22. Cattell (14)*

Grateful—Thankless

Curious—Unenquiring

Friendly—Hostile

Soft-Hearted—Hard-Hearted

Idealistic—Cynical

*F2-3.1. Cattell (9)*

(Perfect overlap of F2 and F3)

Grateful—Thankless

—Treacherous

Kind—Ruthless

Friendly—Hostile

Soft-Hearted—Hard-Hearted

—Jealous

Generous—Tight-Fisted

—Slandorous

*Nuclear Cluster F3.*

Friendliness, Generosity,

Cooperativeness

v.

Hostility, Meanness,

Obstructiveness

*Nuclear Traits*

Friendly—Hostile

Generous—Tight-fisted

Cooperative—Obstructive

—Phobic

*Overlapping phenomenal clusters in F3.**F31. Cattell (24)*

—Agoraphobic

Friendly—Hostile

Generous—Tight-Fisted

—Jealous

Cooperative—Obstructive

*Nuclear Cluster F4.*

Cynicism, Suspicion, Dishonesty

v.

Idealism, Trustfulness, Respecting

Self and Others

*Nuclear Traits*

As in F41 opposite

*Overlapping phenomenal clusters in F4.**F41. Cattell (50)*

Cynical—Idealistic

Suspicious—Trustful

Dishonest—Honest

Slandorous—Praiseful

—Self-Respecting



*Nuclear Cluster F5.*

Obstructionism, Cynicism,  
Unstable Hostility

v.

Idealism, Affection, Sensitive Con-  
sideration

*Nuclear Traits*

Obstructive—Cooperative

Cynical—Idealistic

Ruthless—Kind

Headstrong—Gentle

(Self-Distrusting—Self-Confident)

*Overlapping phenomenal clusters in F5.*

*F51. Cattell (18)*

Obstructive—Cooperative

Cynical—Idealistic

Extrapunitive—

Hostile—Friendly

Self-Distrusting—Self-Confident

(Headstrong—Gentle-Tempered)

(Habit-Bound—Labile)

*F52. Cattell (62)*

Idealistic—Cynical

Gentle-Tempered—Headstrong

Home and Family Interests—

*F5-6.1. Williams*

A cluster subtending F5 and F6, and possibly  
some of Sector A.

Affectionate, Polite, Sympathetic, Socially Con-  
trolled, Sensitive.

*Nuclear Cluster F6.*

Benign Emotional Maturity

v.

Slandorous, Jealous, Self-Pitying

Infantilism

*Nuclear Traits*

Jealous—

Slandorous—Praiseful

—Kind on Principle

Infantile—Mature

*Overlapping phenomenal clusters in F6.*

*F61. Cattell (17)*

Jealous—

Thankless—Grateful

Slandorous—Praiseful

Treacherous—

Self-Pitying—

Infantile—Mature

*Nuclear Cluster F7.*

(Paranoid schizoid

v.

Trusting cyclothme.)

Sadistic, Vindictiveness, Suspicion,

v.

Good Temper, Unresentfulness,

Complaisance

*Nuclear Traits*

Sadistic—

Sarcastic—

Vindictive—Unresentful

Suspicious—Trustful

Shrewd—Naive

*Overlapping phenomenal clusters in F7.*

*F71. Cattell (35)*

Sarcastic—

Sadistic—

Vindictive—Unresentful

Irritable—Good Tempered

Suspicious—Trustful

*F72. Cattell (55)*

Sadistic—

Lethargic—Hurried

Shrewd—Naive

Sarcastic—

Vindictive—Unresentful



## 10. SECTOR G. LIVELINESS, INSTABILITY, VERBAL EXPRESSIVENESS

v.

## RESERVE, QUIESCENCE, NATURALNESS

*Nuclear Cluster G1.*Austerity, Thoughtfulness,  
Stability

v.

Playfulness, Changeability,  
Foolishness*Nuclear Traits*Austere—Profligate  
Thoughtful—Unreflective  
Deliberate—Impulsive  
—Mischievous  
Stable Emotionally—Changeable  
Reserved—Intrusive  
(Serious—Frivolous)  
(Cautious—Reckless)*Nuclear Cluster G2.*Verbal Skill, Interesting Ideas,  
Inquisitive

v.

Narrow Interests, Absence of  
Flattery*Nuclear Traits*

As in G21, opposite.

*Nuclear Cluster G3.*Eloquence, Affectedness, Amusing  
Conversationalism

v.

Self-Effacement, Inarticulateness,  
Naturalness*Nuclear Traits*Exhibitionist—Self-Effacing  
Eloquent—Inarticulate  
Original—Banal  
Affected—Natural  
Debonnaire—  
Flattering—*Overlapping phenomenal clusters in G1.**G11. Sanford-Murray*Need Play, Need Exposition, Impulsivity,  
Change. (Called "Lively Self-Expression.")*G12. Maurer*

Grave, Meditative, Cautious, Careful.

*G13. Cattell (7)*Austere—Profligate  
Wise—Foolish  
Deliberate—Impulsive  
Thoughtful—Unreflective  
Reserved—Intrusive  
Stable Emotionally—Changeable  
Serious—Frivolous*Overlapping phenomenal clusters in G2.**G21. Cattell (42)*Verbal Aptitude—  
Curious—Unenquiring  
Interests Wide—Interests Narrow  
Flattering—*Overlapping phenomenal clusters in G3.**G31.\* Flemming*Amusing, Entertaining, Interesting in Con-  
versation*G32. Cattell (31)*Eloquent—Inarticulate  
Exhibitionist—Self-Effacing  
Treacherous—  
Flattering—  
Imitative—*G33. Cattell (23)*Affected—Natural  
Exhibitionist—Self-Effacing  
Talkative—Taciturn  
Debonnaire—

\* Some interpretation of G31 is involved, since it is in terms of effects on the observers rather than in traits.



*Nuclear Cluster G4.*

Creativity, Wit, Emotional Color

v.

Dullness, Banality, Stability

*Nuclear Traits*

Original—Banal

Clever—

Witty—

Constructive—

Enterprising—Shiftless

Vivacious

Talkative—Taciturn

(Changeable—Stable Emotionally)

(Curious—Unenquiring)

*Overlapping phenomenal clusters in G4.*

*G41. Sanford-Murray*

Creativity, Need Understanding, Need Exposition, Change, Intensity. (Called "Colorful, Intelligent, Self-Expression.")

*G42. Flemming*

Competent, Has Individuality, Lively, Sense of Humor, Witty

*G43. Cattell (64)*

Enterprising—Shiftless

Original—Banal

Witty—

11. SECTOR H. IMAGINATIVE INTUITION, CURIOSITY, CARELESSNESS

v.

THRIFT, INFLEXIBLE HABITS, SMUGNESS

*Nuclear Cluster H1.*

Thrift, Tidiness, Obstinacy

v.

Lability, Curiosity, Intuition

*Nuclear Traits*

Habit-Bound—Labile

Thrifty—Careless

Logical—Intuitive

Pedantic—Disorderly

*Overlapping phenomenal clusters in H1.*

*H11. Olinick*

Obstinate, Thrifty, Tidy (Exact).

*H12. Cattell (61)*

Habit Bound—Labile

Logical—Intuitive

Thrifty—Careless over Property

(Unenquiring—Curious)

*Nuclear Cluster H2.*

Creativity, Curiosity, Intuition

v.

Stability, Insensitiveness

*Nuclear Traits*

Constructive—

Curious—Unenquiring

Introspective—

Intuitive—Logical

Changeable—Emotionally Stable

*Overlapping phenomenal clusters in H2.*

*H21. Sanford-Murray*

Creativity, Need Sentience, Need Understanding, Endocathection, Intracception, Change. (Called "Sensitive Imaginative Creation.")



## 12. SECTOR I. BOHEMIAN, DISORDERLY

v.

## PERSEVERING, PEDANTIC

*Nuclear Cluster I.1.*Profligacy, Planlessness,  
Friendliness

v.

Austerity, Hostility, Perseverance

*Nuclear Traits*

As in I11. opposite.

*Overlapping phenomenal clusters in I1.*

I11. Cattell (48)

Profligate—Austere

Disorderly—Pedantic

Planless—Planful

Friendly—Hostile

(Quitting—Persevering)

## 13. SECTOR J. AESTHETIC INTERESTS, THOUGHTFULNESS, CONSTRUCTIVENESS

*Nuclear Cluster J1.*General Aesthetic Interests,  
Thoughtfulness, Constructiveness*Nuclear Traits*

General Aesthetic Interests—

Musical Ability—

Thoughtful—Unreflective

Constructive—

*Overlapping phenomenal clusters in J1.*

J11. Cattell (36)

Artistic Interest—

General Aesthetic Interests—

Thoughtful—Unreflective

Constructive—

Musical Ability—

(Ambitious—Unambitious)

J12. Cattell (63)

Musical Ability—

General Aesthetic Interests—

Musical Interests—

## 14. SECTOR K. PHYSICAL STRENGTH, ENDURANCE AND COURAGE

v.

## PHYSICAL INACTIVITY, AVOIDANCE OF DANGER

*Nuclear Cluster K1.*Title as above,  
Traits opposite in K11*Overlapping phenomenal clusters in K1.*

K11. Cattell (57)

Physical Strength and Endurance—Claustrophobic

Courageous—Cowardly

(Physical Activity Interests— )

(Physically Energetic and Active— )

## 15. SECTOR L. AMOROUSNESS, PLAYFULNESS

v.

## PROPRIETY

*Nuclear Cluster L1.*

Title as above

*Nuclear Traits*

As in L11, opposite.

*Overlapping phenomenal clusters in L1.*

L11. Cattell (58)

Amorous—Lustless

Eccentric—

Mischievous—



16. SECTOR M. ALCOHOLISM, REBELLIOUSNESS, CARELESSNESS

v.

PIETY, REVERENCE, THRIFT

*Nuclear Cluster M1.*

*Overlapping phenomenal clusters in M1.*

Title as above.

M11. Cattell (59)

*Nuclear Traits*

Alcoholic—

As in M11, opposite.

Worldly—Pious

Rebellious—Reverent

(Selfish—Self-Denying)

(Careless with Property—Thrifty)

17. SECTOR N. CURIOSITY, WIDE INTERESTS

v.

LIMITED INTERESTS

*Nuclear Cluster N1.*

*Overlapping phenomenal clusters in N1.*

Title as above

N11. Cattell (65)

*Nuclear Traits*

Curious—Unenquiring

As in N11, opposite.

Wide Interests—Narrow Interests

Political, National Interests—

18. SECTOR O. HYPOCHONDRIACAL, TACITURN RETROVERSION

v.

ELOQUENCE, INTEREST IN FUTURE

*Nuclear Cluster O1.*

*Overlapping phenomenal clusters in O1.*

Title as above.

O11. Cattell (66)

*Nuclear Traits*

Antevert—Retrovert

As in O11, opposite.

Eloquent—Inarticulate

—Hypochondriacal

19. SECTOR P. ASCETICISM, ECCENTRICITY

v.

COMFORT-LOVING CONVENTIONALITY

*Nuclear Cluster P1.*

*Overlapping phenomenal clusters in P1.*

Title as above

P11. Cattell (68)

*Nuclear Traits*

Ascetic—Sensuous, Comfort Seeking.

Individualistic—Conventional

As in P11, opposite.

Eccentric—

( —Plaintive)

20. SECTOR Q. INFLEXIBILITY, WANDERING

v.

ADAPTABleness, EASE OF SETTLING DOWN

*Nuclear Cluster Q1.*

*Overlapping phenomenal clusters in Q1.*

Title as above.

Q11. Cattell (69)

*Nuclear Traits*

Inflexible—Adaptable

As in Q11, opposite,

Wandering—Settling Down



## V. REVIEW

A survey of 131 *phenomenal clusters*, established in 14 independent researches, has shown that they fall, with little ambiguity, into 50 *nuclear clusters*, gathered in 20 topologically and psychologically distinct regions or *sectors* on what has been called (6) the *personality sphere*. In a minority of instances the boundaries do not prove to be sharp, and a few clusters, not established with sufficiently rigorous criteria, sprawl over two or three nuclei.

In closing it is relevant to point the possibilities by some entirely free speculation. Once the data are preserved in the above index system against the sclerosis of premature verbal coinage and the insidious assault of implicit interpretation, freer discussion may safely be indulged in 'out of court.' One can note that a majority of the clusters established by correlation procedures seem to be actually well known syndromes of the clinic and the laboratory. AB3 appears to be the syndrome of general neuroticism pursued in questionnaires; AB4 the clinical picture of conversion hysteria, AA1 the psychopathic personality, AC1 constitutional, agitated melancholia, and E1 and E2 two varieties of hypomania.

The schizoid pattern appears to be actually split up into several facets. F4 and F7 are clearly two developments of paranoid personality; AB1-2, AC2 and E3 indicate the pre-psychotic personalities respectively of simple, catatonic and hebephrenic schizophrenics; P1 suggests the hermit-eccentric schizothyme and Q1 presents a glimpse (a pattern fragment, albeit a nuclear fragment) of the ambulatory schizothyme.

Experiment and test results also link up with these clusters. B4 offers the main manifestations of Spearman's general ability factor, the personality associates of which ramify throughout the B sector. Spranger's aesthetic type, as measured by the Allport-Vernon Study of Values, seems to have the pattern of J1. The fairly remote divergence of F6 and B1 may indicate that Willoughby's 'Measure of Emotional Maturity' should be oriented to two measurements, while the six nuclei found in the CA sector suggest a revision along similar lines, of Allport's Ascendance-Submission measure. The vague entity measured by many extraversion scales is perhaps the whole of sector D, with its five distinct patterns. Thurstone's antevert-retrovert measure is given new content (hypochondria with retroversion) by O1. The concept of 'general inhibition' of personality, suggested alike by animal studies and philosophical generalizations, is given form by CB3, but the similarly founded notion of 'dominance' does not receive support as constituting a useful single pattern.

Physiological-constitutional unities also appear, as in E4, which is clearly Burt's 'general emotionality' syndrome (3), CB1-2 which is Sheldon's 'somatonia' and CB4 which suggests a 'hyperthyroid hypersensitivity' syndrome.

The subtler adjustments which escape typology but not the psychologist in the consulting room are also represented, and there are, further, patterns which suggest that correlation technique is capable of revealing less crude syndromes than those required to arrest clinical attention. F3 seems a central variety of obsessional-compulsive personality; CA1 presents the standard description of inferiority overcompensation; while H1 is clearly the character neurosis of the anal erotic character.

That correlation cluster analysis is capable of yielding, without any conspicuous absentees, the principal syndromes known to the clinical-experiential approach, but in more exact form, is highly encouraging. Now that perspective is attained research is ready, through inspection of the phenomenal clusters in any one of these nuclear syndromes and through the trial of further variables, to fill out completely the set of trait variables rightly belonging in any one



nucleus and to seek the causes of variation of phenomenal clusters. It is of great interest to compare the cluster structure also with that obtained in animal studies; also to augment and gradually transform the clusters found for human beings by adding test variables among the ratings. Above all, the stage is set, through the surer grasp granted by this precise description, for more exact studies than have hitherto been possible regarding nature-nurture and developmental problems of personality.

Nevertheless, the greatest interest attaches, not to the establishing of long-suspected syndromes, but to the discovery of many patterns hitherto unobserved, each of which, when confirmed, could be the starting point of a whole realm of personality research.

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# SYMPTOM AND SYNDROME STATISTICALLY INTERPRETED

STANLEY S. MARZOLF\*

*Illinois State Normal University*

*Clinical literature, explicitly or by implication, attaches greater significance to a concurrence of symptoms than to the existence of any one of the symptoms taken singly.* Consideration of the possible reasons for such a belief entails an examination of the concepts symptom, syndrome, diagnosis, and causality. The result is that these concepts are best defined in statistical terms.

## THE MEANING OF SYMPTOM

A symptom is an aspect of behavior. If we are concerned with physiological behavior, such as the functioning of the heart, we may note valve sounds, rate of the beat, or regularity of the beat. Each of these aspects of function may be considered a symptom. When observing molar or psychological behavior, for example, an individual in conversation, we may observe tone of voice, gestures, or flushing of the face. Each of these likewise may be thought of as a symptom. Psychologists often take into account implicit symptoms, as in the study of emotion, but since the clinician deals with overt behavior and verbal reports of subjective states, it is these kinds of symptoms which will concern us here.

In the practice of medicine, the detection of irregularities in the composition of body fluids and similar discoveries are referred to as being symptomatic. Likewise in psychological counseling, letters, drawings, or other products of an individual are sometimes thought of as symptomatic. In both of these cases, that which is symptomatic is the product of a manner of functioning, and it is the manner of functioning with which we are really concerned.

Unfortunately symptom is usually thought of as referring to maladjusted behavior (26, 30). However, Warren (26), in a second definition, extends the concept to include any phenomenon, not necessarily related to disease or maladjustment. This latter point of view is much to be preferred since it helps overcome the belief that mental disease and maladjustment are special manifestations, related to general psychology by courtesy only. A frown may be a symptom of concentration just as much as a tic may be a symptom of neurosis.

Warren's definition also emphasizes that a symptom points to the presence of an otherwise unsuspected condition or state. We recognize

\* I am indebted to my colleague, Henry A. Poppen, for many valuable suggestions, but take full responsibility for the ideas developed herein.



that any manner of functioning must be the consequence of something else. We have said that an aspect of behavior *may* be thought of as a symptom because it is customary to speak of phenomena as symptoms *only if we feel that they need explanation. Too often, as Guthrie has pointed out, we feel called upon to explain only that behavior which differs from our own; ours is natural and lawful.*

*When a phenomenon is thought to need explanation it is common* to refer to it as abnormal. Originally this meant more than just unusual; it meant nonlawful. Vestiges of belief in nonlawful symptoms are still encountered. However, if we expect an explanation of symptoms we are in effect tacitly admitting a lawfulness to their occurrence. It is the explanation of symptoms to which we shall now turn.

#### SYMPTOMS RELATED TO SYNDROMES

Cohen and Nagel (10, pp. 245-247) discuss ways in which we try to order the phenomena of the natural world and thus explain them. There are two ways which are especially applicable in this discussion. First, we classify phenomena as things or entities which have an invariant conjunction of properties or characteristics. It is this sort of ordering or explanation which is involved in organizing symptoms into syndromes, if and when this can be done. A second kind of explanation is the establishment of causal relations. In this case we likewise search for invariant relations, though here they are between antecedents and consequents. These two types of order or explanation will be considered in turn.

Abstraction and generalization from experience, controlled or uncontrolled, give rise to concepts, things, or entities. The concept is an invariant conjunction of properties or characteristics. Some concepts are known as syndromes. Warren (26) defines syndrome as an aggregate of symptoms. The symptom may be thought of as one of the invariant characteristics of the thing or entity. Examples of syndromes in the field of human maladjustment are hysteria and schizophrenia. There does not seem to be any reason for limiting the term syndrome to manifestations of maladjustment, however. Any behavioral complex might be thought of as a syndrome, and in fact Maslow (22) has used the term in discussing the organization of personality traits.

Psychiatric literature occasionally contains implications that an entity is to be distinguished from a syndrome or at least that not all syndromes are entities. The reason for this view is not clear but from the context of such statements it seems that the writers restrict the term entity to occasions when the etiology is fairly well known. This does not seem to be a good reason for making the distinction.

Occasionally a distinction is made between syndrome and mental



disease, though again the basis for the distinction is not explicit. Sometimes the distinction seems to be that the disease is the cause of the syndrome. For our present purpose we shall make no such distinction. A syndrome is a behavioral complex the existence of which is evidenced by the concurrence of a group of symptoms.

It is possible that there are hierarchies of syndromes. A group of symptoms existing in conjunction constitute a syndrome, such as kleptomania. Briefly this syndrome would consist of two main symptoms, taking the property of others and the report of a feeling of compulsion. But kleptomania might occur together with other similar syndromes to form a more complex organization known as psychasthenia. Viewed in this connection kleptomania would be called a symptom. Whether this is a proper view of psychasthenia or whether psychasthenia should continue to be recognized as a syndrome may be questioned. We intend only to illustrate the possibility of hierarchical organization of symptoms.

Syndromes are frequently named in accordance with the supposed etiology, as for example neurasthenia and hysteria. Sometimes the name signifies what is thought to be the most striking characteristic of the pattern, as schizophrenia and manic-depressive psychosis. This latter procedure is much more desirable, though perhaps in the interest of scientific caution an even more objective designation, a letter or nonsense syllable might be justified.

The ordering of symptoms into syndromes is then one type of explanation. It is a preliminary stage in the scientific process. A symptom may be explained by saying that it indicates (not it is *due to*) the existence of the syndrome.

A case of stealing may be explained by saying that it indicates psychasthenia, or a case of amnesia by saying that it indicates hysteria. There are those who will say that this is no explanation at all; it is merely naming. They will be right if the person for whom the explanation is intended knows nothing about psychasthenia or hysteria. To him who does it will mean, in the first case, that the objects stolen were not used by the thief; they were taken because of an unaccountable urge. No ordinary means of curbing the stealing will be effective; psychotherapy is required. In the second case, the informed person will know that hysterical amnesia did not result from a physical trauma, that it represents a flight from an intolerable situation.

This process of explaining a symptom by showing it to be one element of a syndrome is what is often meant by diagnosis. This seems to be the meaning held by Henderson and Gillespie (15, p. 21) when they say, "... it is not the diagnosis that matters, but the understanding of the disorder. ..." Obviously for them identifying a group of symptoms as belonging to a syndrome is one thing, but understanding it is something else.



Henderson and Gillespie seem to disparage this sort of diagnosis and they are by no means alone in such an opinion. McDougall (20, p. xi), speaking of the purpose of his own book, says, "Its standpoint is . . . that of a student of human nature. It is therefore but little concerned with classification of diseases." Shaffer (24, p. 187) differentiates abnormal psychology from psychiatry by saying that while the former aims to understand the origins of abnormal behavior, the latter seeks to classify and cure it." Bentley (5, p. 3) separately classifies those whose interests in mental disorder are chiefly in the routine of classification and care.

True it is that psychiatric practice has often appeared to express belief in a mystical and final quality supposed to inhere in classification. This however is not the general view. It has previously been pointed out (21, p. 111) that the aim of all scientific endeavor is the description of a multitude of phenomena in terms of a few categories. These categories are dynamic concepts, but the delineation of static descriptive categories seems to be a necessary preliminary. Cattell (8, p. 560) expresses it by saying that the law that nosology precedes etiology is not easily broken. One wonders too how cures may be effected without understanding, save by limited empirical treatments. It is again the issue of description as opposed to explanation. Geldard (13) clearly shows that explanation is but a more advanced form of description. It is true that full understanding is not achieved by means of nosological classification, the description of syndromes, but, if the entities are looked upon as provisional, such classification may be, and doubtless has been, a necessary preliminary. Relating symptoms to syndromes is but a preliminary phase of explanation.

However useful the description of entities may be, it is necessary to recognize certain difficulties which are encountered in so doing. These difficulties are especially notable when dealing with the psychoneuroses and psychoses. Anyone with receiving-ward experience knows how often the individual case fails to fit neatly into any of the available categories. There are any number of confusion symptoms which obscure the syndrome in much the same way that confusion color-sensitivity tests disturb the judgments of the color-weak individual. One is often inclined to doubt the existence of disease entities or syndromes save as unexplained special cases. Yet these stereotypes do exist. Cobb (9, p. 208) has commented upon the fact that in spite of the wide diversity of ways in which human beings vary, disease entities are discoverable.

This lack of clarity or sharpness of delineation of the syndrome reveals itself in two ways.

*First, it is difficult to discover an invariant conjunction of symptoms which constitute a syndrome. What for example, are the invariant symptoms of psy-*



chasthenia? Certainly kleptomania is not. Neither are abulia, a phobia, depersonalization, or doubts and scruples. This difficult situation will have its analogue later in the discussion of the causal relation.

It should be noted that not all complexes to which the term syndrome may be applied exhibit this same lack of invariant conjunction. If we think of kleptomania not as a symptom related to a syndrome, but as a syndrome itself, then it appears that a case of invariant conjunction is fairly well established. Feelings of compulsion and appropriating the property of others are invariably associated. In fact we do not use the term kleptomania unless these two aspects of behavior do occur together.

The situation may be clarified by considering an analogy. One instance of invariant conjunction of characteristics or properties is water. It has certain physical characteristics, such as density, viscosity, and boiling point. Each of these has a certain value under a certain set of prescribed conditions. The pressure under which water exists will change both its density and its boiling point. How and why this is so is understood when the cause of the properties is understood, namely the molecular structure.

Is it not possible therefore that under certain fixed conditions psychasthenia would always manifest the same symptoms? It may be the fact that the mechanism which brings about the psychasthenic reaction operates under a great variety of situations which accounts for the varying content of the syndrome. It is the extreme variability of response of which the human organism is capable that is probably responsible for the diverse forms of the syndrome. Psychasthenia is thought to exist because all the above-mentioned symptoms are occasionally found to occur together and more often two or three are found to occur together. The syndrome is a central tendency rather than a fixed pattern with fixed boundaries or an invariant conjunction. It is best thought of in statistical terms.

Westaway (27, p. 217) describes such central-tendency concepts and uses biological species as an example. Shaw (25, p. 37) quotes Bergson as saying that a group must not be defined by the possession of certain traits but by its tendency to emphasize them. That is, in the syndrome certain characteristics are more likely to appear than not.

A second reason that a syndrome often lacks clarity is that, not only are some symptoms absent when the syndrome is considered to be present, but also a given symptom may be present in more than one syndrome. A flushed face may be observed in anger, embarrassment, and physical exertion. We diagnose the significance of the flushed countenance on the basis of other symptoms or from the character of the situation. When such identification has taken place we may even give the symptom a different name, e.g., blush rather than flush. Now in this connection the introductory statement about the added significance of a number of symptoms may be interpreted. Since the joint occurrence of two symptoms is highly improbable on the basis of chance, there must be some other reason for the concurrence, some causal factor. The two symptoms are thought to be a part of a syndrome of which still other components may be found.

These difficulties in defining a specific syndrome point to the need for a statistical interpretation. Invariant conjunction is too rigorous a criterion. Statistical interpretation will be made in terms of correlation and factor analysis. First, however, let us consider the problem of causal explanation.



## SYMPTOMS CAUSALLY EXPLAINED

Symptoms are events which have antecedents, and the concurrence of symptoms in frequencies greater than chance likewise implies some antecedent condition. The establishment of syndromes is preliminary to the discovery of etiology. This procedure is an example of explanation by referring to the second kind of order listed by Cohen and Nagel, namely causal explanation.

Diagnosis then ultimately requires knowledge of etiology. We want to know the cause. This may be thought necessary merely to satisfy curiosity or it may be desired so that effective therapy may be instituted. Of course therapy does not always await the discovery of etiology. We have empirical treatments, of which shock therapy is currently one of the outstanding examples. Even if knowledge of etiology were not necessary for completely satisfactory therapy we would still need such knowledge for prophylaxis and hygiene.

When we wish to know the cause we may mean that we want to know the essential conditions, not observable directly, which account for the syndrome. This is what Lewin (19, p. 30) refers to as systematic causation. The clinician finds it difficult to be content with this sort of causation and seeks to explain the existence of the syndrome in terms of Lewin's historical causation, referred to by Johnson (18, p. 515) as *mnemonic*. The clinician wishes to know the way in which the individual got the way he is. Compensatory behavior may be explained by saying that it is exhibited by an individual who feels inferior and has certain other traits. We wish to know more. How did he develop the inferiority attitude and the other traits which combine to constitute the compensatory response?

The nature of the causal relation may be defined in a practical way without recourse to metaphysical interpretations. Such a practical definition is provided by Mill's canons. Referring to these, Bennett and Baylis (4, p. 377) state, "... the methods, insofar as they are applicable, suggest statements of minimal conditions which characters must meet to be causes or effects." The canons show the operations by which causal explanation may be approached; they do not assure proof.

Johnson (18) has developed a logical definition of causality related to theorems of material implication which is as follows:

$$P \text{ c } Q = .(PQ')'$$

The relation *c* is invariant and as follows: It does not happen that *Q* fails if *P* happens, nor that *P* happens if *Q* fails. For example, if *P* represents the habit of repression (inhibition of recall) and *Q* is a phobia, then if "*P c Q*" is true, whenever there is a habit of repression, then there will be a phobia. Furthermore, whenever an individual does not have a phobia, he will not have the habit of repression. No one is ready to accept this illustration as being in ac-



cord with the facts, therefore we cannot say that a habit of repression is the cause of a phobia. Yet there is considerable clinical evidence to show that the two phenomena are related.

In the case in which P happens but Q fails to appear, that is, an individual has the habit of repression but does not develop a phobia, it is clear that the habit of repression may be necessary for the development of a phobia, but not sufficient for it. There must have been a fear response in a situation involving also a guilt-feeling response. It takes at least three conditions to bring about the effect. The cause then is a complex made up of a number of factors.

Some of the factors may be negative ones. It may be that the effect Q will occur if factors, n, c, and p are present and m is absent. The factors present may be related to each other in various ways, quantitatively expressed. For example, Q may follow from  $3x$  plus  $2n$  and not from  $3x$  plus  $n$ . Wolf (28, p. 109) defines the cause of an event as the minimum totality of conditions which are necessary and sufficient. If an invariant relation is to be established, P must be considered complex.

If we should discover a case in which a phobia existed and there was not a habit of repression, then we would conclude that a habit of repression is not necessarily an antecedent of phobia.

As Johnson describes the c relation, it is non-symmetrical, that is, the presence of Q does not insure the presence of P. For example, if we believe that an individual with intelligence below a certain point will fail a course, we would not infer that because a student has failed the course his intelligence is below the prescribed level. This may lead us to conclude that for an effect there may be a plurality of causes. Failure of a course may then be due to lack of effort, lack of adequate prerequisites, as well as low intelligence.

How then can we ever hope to diagnose a particular case of failure? Cohen and Nagel (10, p. 270) suggest getting around this difficulty by considering the effect as not properly analyzed. We must recognize that all cases of failure are not the same. The best objective definition of failure, falling below a certain score on an examination, is then only one aspect of the effect. We must discover other aspects of the total effect, namely the student's attitudes, his study activity, and other circumstances. Otherwise we would be left with the only common element in all cases of failure, namely lack of knowledge or skill. Such a conclusion is not very helpful.

This treatment of the difficulty of plurality of causes is tantamount to defining the causal relation as symmetrical, a condition, which Johnson recognized only as a special case. His more general case describes only the detection of a causal factor common to several diverse effects.

This discussion of explanation of a symptom by relating it to a causal order has brought out difficulties similar to those encountered in relating symptom to syndrome. High probabilities of association can be established but invariant relationship is difficult to establish in either case. Establishing causal relations is seen to require either the analysis of a complex effect into component syndromes or the discovery of the syndrome to which an apparently isolated symptom belongs. The dis-



covery of the syndrome and discerning causal relations usually go on contemporaneously.

In the situations in which we seek causal relations, both P and Q are complex and confounded with other factors. In the physical sciences analysis of both cause and effect has been possible by experimental control. The separate and conjoint effects of the several causal factors have been described in functional terms, and invariant relations have thus been established. That this can be done in psychology is at present a remote possibility. Guilford (14, p. 573) goes so far as to say it cannot be done.

#### STATISTICAL INTERPRETATION DESIRABLE

Nevertheless associations between effects and causal factors have been achieved. How have such relations been established when, logically, you either have a causal relation or you do not? The answer is that implicit statistical inferences have been made. It is not necessary to await experimental control, however desirable it would be, when the statistical approach is available. It is an approach suited for the purpose of "relating a universe of causes with a universe of effects" (1, p. 370).

It is desirable to make an open avowal of a statistical approach, and as Brunswik (6, p. 262) says, "become statistical throughout instead of being statistical where it seems hopeless to be otherwise." Steps in this direction have certainly been taken in the past but they are becoming increasingly noticeable. Dodd (11), for example, has gone so far as to give logical analysis a statistical interpretation. Specifically, the identification of syndromes and the discovery of causal relations may be conceived of statistically. Correlation analysis, especially factor analysis, provides an excellent conceptual framework for these tasks. The statistical approach does not mean neglecting the individual exceptions as Babcock (3, p. 19) charges. The individuals who do not fit the general trend spur the statistician to more comprehensive analyses.

*Correlation Analysis.* Whenever a clinician notices that two symptoms occur together he is recognizing the existence of positive correlation. When one of the symptoms is observed he is inclined to look for the other, with an expectation determined by the standard error of estimate. Lack of perfect correlation suggests that one of the symptoms may occur independently of the other and possibly in association with a third symptom. Or, it is possible that the second symptom is negatively correlated with a third symptom which is present, but uncorrelated with the first one. This third symptom may thus be any chance factor in the environment. Intercorrelations, some positive and others negative, if fairly large, serve to define a syndrome. It is apparent



therefore that the more positively-correlated symptoms that are actually observed in conjunction the more certain it is that the entire syndrome is present. Finally, intercorrelations between symptoms whether it be two or more than two, indicates communality. It is not necessarily true that this communality represents a causal factor, but when the phenomena are contemporary it seems reasonable to define it as a causal factor or complex of factors. It is however possible to speak in terms of systematic causation and speak of the syndrome as caused by the concurrence of certain factors which show intercorrelations.

It is possible to make inferences concerning the nature of the causal factors accounting for intercorrelation between symptoms. This would be possible if, on the basis of clinical evidence or deductions from experimentally established laws, crude as they may be, the cause of one or two of the symptoms may be established. However, it would be much easier to determine causal relations if we had correlations between symptoms and antecedents.

If a given antecedent is correlated with a certain symptom we may have evidence of a causal relation, although both antecedent and symptom may be consequents of some other factor. In the interests of brevity this possibility as well as the case of negative correlation will be neglected. Any positive correlation which exists will in all probability be less than perfect. The existence of a pronounced fear situation in the history of an individual may be correlated with the existence of a phobia, though not perfectly. This indicates that some other factors are necessary for a phobia to occur. Each of these other factors will be positively correlated with the occurrence of a phobia. If all necessary factors are known, the multiple correlation of these factors with the existence of phobia will be perfect. This is a statistical definition of complexity of cause.

Lack of perfect correlation between antecedents and symptom may seem to indicate plurality of causes. As an example, a number of factors will each show positive correlation with delinquent behavior. Now delinquency is not a syndrome but can be analyzed into various differentiated syndromes. If this is done and correlations between each of the same factors and the occurrence of each of the resulting syndromes are again determined, some would reduce to zero and others would become significantly larger. In such a case the multiple correlation between the antecedents and unanalyzed delinquency would probably be no greater than the largest zero-order correlations. In reality the situation is one in which a number of syndromes are subsumed under one head, namely delinquency, on the basis of one symptom, an illegal act. This is the true situation in every case where plurality of causes



seems to be indicated. The notion of plurality disappears when the syndromes which contain the one particular element, the illegal act in this case, are differentiated.

Knowing correlations between antecedents and symptoms permits certain generalizations which may be referred to as "probability laws" (6, p. 269). The regression equation relating a causal factor and a symptom will not assure perfect prediction; when the influence of the specific causal factor is removed certain net relationships will remain. Ezekiel's (12) methods for analyzing these net relationships are suggestive of methods of approach to the problem of complex causation.

Certain possible forms of relationship between causal factors and symptoms have not received the attention they deserve. For example, a variable may become significant only when it exists in an amount above a certain critical point; for values above this point the correlation between the antecedent and the consequent might be very high. The same thing might be true when the value of the variable falls below a certain point, though of course this would be changed into the first case by reversing the scoring. Furthermore, a variable might be significant only at the extremes of the range. The correlation with any syndrome or symptom in the middle range might well be zero but be high when values at the extremes are used. A scatter-plot could be made by giving values to the measure of the trait which begin at zero for the upper and lower critical points and increase in magnitude toward the extremities. Flanagan's C2 factor obtained by the Bernreuter Personality Inventory seems to promise likely vindication of this point. Finally, the possibility of curvilinear relationship must never be overlooked.

*Syndromes and Factor Analysis.* In addition to the possibilities of correlation analysis just described there is now available a well-developed factor theory which provides a comprehensive framework in which to interpret associations among symptoms and between symptoms and their antecedents.

If it is possible to consider the human traits usually involved in factor analysis studies as symptoms, as noted above, then it is reasonable to apply factor analysis methods to the forms of behavior usually referred to as symptoms. These symptoms are evidence of malfunctioning or maladjustment.

If a large number of symptoms are correlated with one another the results can be arranged in a correlation matrix. Such a set of correlations could very probably be re-arranged to form groups. The inter-correlations within a group would be greater than the average inter-correlation between members of the group and those items not included in the group (16, pp. 23-24). These groups would represent syndromes.

If all the symptoms could be included in such groups, with none



having correlations with those in other groups we would have an arrangement described as the uni-factor pattern. Any symptom not included in a group might become a member of a new group if other symptoms were included in the correlations.

That such a situation might be found, even if a complete catalogue of human symptoms and an infinite population of individuals could be considered is possible but unlikely. There is too much clinical evidence showing that many symptoms are found in more than one clinical entity.\* Thus it is most likely that a small number of groups would be obtained but that there would be significant correlations between symptoms in one group and symptoms in other groups. This situation suggests a bi-factor pattern. The syndromes (groups) are sub-groups of maladjustment symptoms. It is further possible that with a very large sample of symptoms we would obtain several large groups each with several sub-groups; in other words, several flights of hollow staircases. One such staircase might very well be the psychoneuroses where the sub-groups would be hysteria, psychasthenia, neurasthenia, anxiety neurosis, and perhaps some others.

A multiple-factor solution might imply that all factors discovered would enter into the production of most if not all the symptoms. However, if the axes are rotated so as to yield as many zero loadings as possible the result, as far as defining syndromes is concerned, might be little different from other solutions.

The existence of correlated factors is also consistent with the concept of syndrome. Each of the oblique axes would pass through a cluster of symptoms. Some of the items of each cluster would have loadings on the other factors, a condition wholly in accord with the observation that many clinical entities have symptoms in common.

*Etiology and Factor Analysis.* The existence of a group of symptoms requires some explanation since it is not conceivable that such a syndrome is due to a chance concurrence. The most satisfactory explanation is one in terms of cause. We may believe that a syndrome exists as a result of some cause. This does not tell us the nature of this cause and, in the terminology of factor analysis, we may refer to it non-committally as a factor.

The nature of a factor must be determined by inferences from the nature of the symptoms to which it is related. The argument follows the form of Mill's canons. Noting the symptoms that are most closely related and the least closely related is one good means of obtaining a clue to the nature of etiology.

\* Of course it is possible that the clinical entities are wrong. The work of Moore (23) certainly suggests this possibility. Hunt (17, p. 47), speaking of the need for experimental studies, expresses doubt of the validity of current diagnostic categories.



It would be much easier to make valid inferences regarding the nature of the factors if an analysis was made of a matrix of correlations between symptoms and antecedents. In this case the causal complex and related syndrome would form a group or sub-group.

The various factor patterns mentioned above take on additional meaning when antecedents are involved in the analysis. A uni-factor pattern would imply that the causal factor that enters into the production of one syndrome is not involved in the production of any other syndrome. The bi-factor solution could be interpreted to mean that one causal factor was involved in all the syndromes, not necessarily to the same degree, and that the sub-groups or differentiable syndromes were produced by other factors, one for each syndrome. The multiple-factor and principal-factor patterns presuppose several independent factors involved in all syndromes but in different degrees, and of unequal importance. In addition, the principal-factor pattern allows for bi-polar factors, so that a syndrome may be described by the presence of certain factors and the absence of others. It is also possible to consider the factors as correlated rather than independent. Belief in a fundamental unity of the organism will make a system of correlated factors seem the most likely final solution to the problem of the organization of human functioning.

When considering maladjusted behavior alone it is conceivable that we might discover the obverse of the situation which would be presented if we were considering adjustive responses. The difference may be that of abilities compared with disabilities. If both kinds of items entered into a correlation matrix it is probable that some sort of bi-polar analysis would be most desirable, especially since there is great difficulty in defining the zeros of traits.

The causal factors discovered by such an analysis would be of the same order as those discovered by inferences from clinical observation. They would be personality traits, expressed either positively or negatively. There would probably be hierarchies of response systems. One important factor which might be discovered is adaptability or lability. Some individual act in stereotyped fashions while others are more labile and given to frequent readjustments, a characteristic which Angyal (2, p. 293) attributes to systems within the personality organization.

The probable outcome of a general analysis of an extremely wide range of behavior functions including abilities and disabilities, antecedents as well as consequents, represents a program for the future. In such an analysis, uniqueness would vanish and common-factor (very probably correlated-factor) variance is all that would remain. With such a prospect in view, it is clear that present limited correlation matrices must be interpreted with their limitations noted. It would



seem wisest to give serious consideration only to those factors which contribute most. Remaining variance should not be considered as ultimate uniqueness until a sufficiently wide sampling of symptoms has been used and it has actually been determined that certain variance is unique.

Insofar as the clinician attempts to diagnose by referring individuals to a diagnostic category he is participating in the support of a type theory. To say that an individual is schizophrenic is to classify him as a "type" of person. Zubin (29) has devised a statistical means of identifying types, and the inverted factor technique developed by Stephenson and others has been acclaimed as the ideal means for such a purpose. However, Burt (7, p. 191) shows that the results of the inverted factor analysis must ultimately be the same as those of the usual analysis, provided that the sample of persons and tests or items is adequate. In this relationship between the results of the usual factor analysis and those of the inverted factor analysis lies the basis for explaining both the popular belief in types and the clinician's belief in discrete disease entities. The type is a syndrome, a clustering of symptoms or traits, brought about by the presence of certain factors. Whether a particular individual will illustrate such a syndrome depends upon the degree to which he possesses each of the factors responsible for the clustering.

This may best be illustrated in terms of a bi-factor pattern. Assume three factors, one general and two group. Assume further that each individual has some amount of each of these factors. Now, if the general factor and the first group factor define one syndrome and the general factor and the second group factor define another, then if an individual has large amounts of the general factor and the first group factor he will be a typical case of the first syndrome. If however, instead of having a large amount of the first group factor he has a small amount of it but has a large amount of the second group factor he would then be typical of the second syndrome. If he had other amounts of the three factors, for example amounts proportional to the total contribution of the factors, he would not be typical of either syndrome and probably would be classified as a mixed or impure type, as is the custom of those who are naive about type notions.

The fact that clinical entities and personality types do have some provisional status at all suggests that perhaps a bi-factor pattern arranged to express positive and negative loadings may be a good approximation of the organization of abilities and disabilities. A more complicated pattern involving oblique factors may possibly turn out to be the best of all.

Our main interest in this discussion has been in diagnosis. However, in conclusion it may be noted the process of prediction is the reverse of diagnosis. In the former procedure certain traits are known and the



probable behavior of an individual in a certain kind of situation is estimated. The success of prediction depends upon the completeness with which relevant factors have been isolated and the validity with which they can be evaluated. In the case of diagnosis, the behavior of an individual is observed and the task is to determine the factors which brought it about. Discoveries by those whose main task is diagnosis and by those who study prediction techniques are complementary. In either case, errors of estimate must be taken into account. In one case we have the regression of  $Y$  on  $X$ ; in the other, of  $X$  on  $Y$ .

### SUMMARY

The requirements of a rigorously defined causal relation are hard to meet. The most suitable conceptual approach is a statistical one. Symptoms and syndromes, when thought of as statistical concepts, can be better understood. Correlation analysis, including factor analysis, provides a means of clarifying and organizing the complex assortment of antecedents and consequents which confuse the clinician. By these means it is possible to relate the symptoms of adjustment and maladjustment into one conceptual pattern. Only the outlines of such a prospect are now possible, yet some steps toward filling in the outlines have already been taken.

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# PSYCHOLOGY AND THE WAR

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## PERSONNEL PROCEDURES IN THE U. S. MARITIME SERVICE

LUIGI PETRULLO

*Lieutenant, United States Maritime Service*

A description of the work of the United States Maritime Service in training men for service in the merchant marine, and of the part that officers and men with psychological training are contributing to this work, has been published.\* In the previous report, classification and selection activities dealing chiefly with trainees were outlined and brief mention made of the developmental work being conducted in the area of personnel procedures for all Maritime Service enrollees assigned to administrative duty. The present report is a further description of the work of the Personnel Procedures Unit in the overall program.

The Personnel Procedures Unit of the U. S. Maritime Service was established in June, 1944, by order of the Commandant. The Unit represents a logical development and expansion of research activities started by Classification and Selection Officers in the various training stations. It is the product of the efforts of many individuals in the Maritime Service who have tried to deal intelligently with various personnel problems.

In the original directive setting up the Unit, its functions were defined as follows:

1. To survey current personnel operations and practices.
2. To devise improved personnel operations and techniques.
3. To prepare indoctrination and educational materials for all Maritime Service personnel.
4. To explain, demonstrate, and supervise newly developed techniques and operations whenever necessary.

\* LIMBURG, C. C., Psychological Work in the United States Maritime Service. *Psychol. Bull.*, 1944, 41, 664-668.



FIGURE I

## PERSONNEL PROCEDURES UNIT: FUNCTIONAL ORGANIZATION

*Officer-in-Charge*

Plans, directs, and coordinates the development of personnel procedures and techniques, and the control of personnel qualifications records and procedures.

*Administration Officer*

Acts as liaison officer between Maritime Service units and central office. Responsible for administrative activities of Unit.

<i>Billet Analysis Department</i>	<i>Examinations Department</i>	<i>Educational Services Department</i>	<i>Qualifications Control Department</i>	<i>Classification Methods Department</i>
Analyzes all rates and ranks in the U.S.M.S. and all jobs in the U. S. Merchant Marine, and prepares job specifications for use in recruitment, selection, upgrading, transfer, and related functions. Conducts organizational surveys of Maritime Service units as required.	Prepares standard examinations for use in determining the skills and abilities of enrollees in order to assist in the proper assignment, classification, promotion, and transfer of enrollees. Prepares standard examining procedures and assists Maritime Service units with all examining problems.	Collects, revises, prepares and distributes educational materials for use in Maritime Service units. Coordinates and assists in administering educational programs conducted in the various Maritime Service units.	Develops personnel forms for the purpose of preparing administrative personnel files. Maintains central files of all personnel. Controls the assignment and transfer of administrative personnel from station to station.	Prepares classification and selection techniques and procedures for use with trainees and administrative personnel.



In order to carry out these functions, the Personnel Procedures Unit was organized into five departments. Figure I shows the functional organization of the Unit.

As indicated on the functional organization chart, the overall supervision of the activities of the Unit is the responsibility of the Officer-in-Charge. For practical reasons the Unit is under the cognizance of the Atlantic District Operations Office. Technical liaison is maintained with Headquarters through the Chief Classification and Selection Officer in Washington. Through this means it is possible to make available to all units of the Maritime Service products which are developed in the Atlantic District.

Under the Officer-in-Charge there is an Administration Officer responsible for the administrative activities of the Unit. This officer also acts as liaison officer between the Personnel Procedures Unit and the various Maritime Service units in the Atlantic District.

Descriptions of the five departments in the Unit follow:

*Billet Analysis Department:* The Billet Analysis Department analyzes rates and ranks within the Maritime Service as well as jobs in the merchant marine. This information is being used for a variety of purposes, such as recruiting, screening, selecting and classifying, transferring, upgrading, and informing personnel; planning and budgeting; eliminating duplicate effort; aiding in the evaluation of the training program; assisting in preparing publicity materials; planning new departments; developing aptitude and achievement tests and application forms; assisting medical officers and enrolling officers; and orienting enrollees.

The analysis of billets in the Maritime Service is now nearing completion. As a result of surveys in one large station and in a number of smaller Maritime Service units representative material has been accumulated. A volume of preliminary job specifications based on this material is currently available. The special duties assigned to each rate in the Maritime Service have been defined and the results have been distributed to Maritime Service personnel.

*Examinations Department:* This department is mainly concerned with the development of examinations and standard promotion procedures. The procedure used in the development of examinations includes the following steps:

1. *Billet analysis:* Through such analysis, the exact duties of each rate are ascertained and described in detail.
2. *Collection of questions:* At the same time that the job is being analyzed, questions designed to reveal the knowledge necessary for the performance of these duties are collected by observing and interviewing experts on the job.
3. *Checking questions:* Questions and answers are then checked by other experts to make sure that they pertain to the job and that the answers are accurate.



4. *Trying out questions:* The best questions are then tried out on men whose abilities are fairly well known. For the most part, those questions are retained that are consistently answered correctly by the *good* men and incorrectly by the *poor* men and about which there are no disagreements as to meaning.

5. *Developing final forms of examinations:* Questions are tested for validity and reliability and the test is put into its final form. Norms are then developed.

6. *Developing alternate forms:* With the questions thus selected as guides, similar questions are collected, tested and selected for alternate examinations.

Through these means, the Examinations Department makes up valid and reliable examinations that will test each person on what he must know in each rate. At present promotion examinations are available for rates in the seaman, artificer, special, and commissary branches. Eventually, all rates in the Maritime Service will be covered. The Examinations Department is also interested in devising standard examination procedures at all units, and is ready to assist all units with examining problems.

*Educational Services Department:* "The preparation of indoctrination and educational materials for all Maritime Service personnel" has been turned over to the Educational Services Department. In the development of these materials, this department works very closely with the other departments already mentioned, as well as with various units of the Maritime Service.

Probably the most important job being undertaken by this department at the present time is the establishment of Ship's Company Schools for newly appointed administrative personnel. Several of these schools are being set up in the U. S. Maritime Service Training Stations with present courses of indoctrination and practical training lasting for a period of from four to five weeks. The new administrative enrollee, upon completion of the course, will be assigned to the particular administrative job for which he best qualifies.

For men already on administrative duty, the Educational Services Department is working on an in-service training program, designed to give general and specific training while on the job.

In addition, the Educational Services Department is preparing a series of pamphlets and booklets on various subjects for distribution to all units to inform men about the Maritime Service, to assist them in preparing for promotion examinations, and to help promote uniformity. Under preparation now are brief articles on Maritime Service Customs and Courtesies, Rates and Ranks in the U. S. Maritime Service, Information on USMS Uniforms, USMS Instructions, and a short History of the American Merchant Marine and the U. S. Maritime Service.

*Qualifications Control Department:* The Qualifications Control Department was set up to survey current personnel operations and prac-



tices and improve them wherever possible. As part of this work, it has developed a Qualifications card ("Q" card). This card provides a complete service record for each enrollee. It includes such personal data as age, height, weight, and marital status and a record of the specific qualifications of the individual enrollee. In addition, it shows the results of the various classification tests, civilian experience, attitudes as reflected in the man's work and disciplinary record, and the service record of the enrollee. Such information, when recorded on standard machine sorting forms, materially assists in the proper placement, transfer and upgrading of personnel.

*Classification Methods Department:* This department is interested in classification and selection problems. Its functions include the analysis, revision, and development of aptitude tests used in the Maritime Service as well as the routine machine scoring of tests used in several units of the Maritime Service.

Typical of the problems undertaken by the Classification Methods Department is the item analysis of tests. Through such analysis, it is possible to tell what percentage of enrollees taking a test answered a particular item correctly or incorrectly, and to determine the relationship of these results to other information about enrollees such as age, education, experience, and performance on the job. This analysis is, of course, useful in determining the effectiveness and reliability of tests.

It is still too early to judge the ultimate value of the work of the Personnel Procedures Unit from the standpoint of improvement of efficiency in all personnel activities. At this date, however, it is apparent that the extension of psychological and related techniques in the Maritime Service will prove of inestimable value in dealing with the multitude of personnel problems which require the sound application of scientific procedures for solution. Job specifications, scientific organizational surveys, standard promotion examinations, comprehensive indoctrination and in-service training materials, qualifications control and other improved personnel techniques are bound to lead, when properly administered, to the greater efficiency and satisfaction of personnel.



# THE VALIDITY OF THE MULTIPLE CHOICE RORSCHACH TEST IN OFFICER CANDIDATE SELECTION

M. B. JENSEN & J. B. ROTTER

*The Armored School, Fort Knox, Kentucky*

The Multiple Choice Group Rorschach Test devised by Harrower-Erickson (1) was given to a select group of army officers and to three classes of the Armored Officer Candidate School in the fall of 1943. Harrower-Erickson in her original article (1) described findings with a variety of groups of maladjusted and normal adults. From these studies she concluded that the test may be used successfully for the screening of neuro-psychiatrically disturbed individuals, although the test in its present stage of development could not be expected to indicate differential diagnosis. Early in 1944 Wittson, Hunt and Older (5) published an account of their experiences with this method in which they found that the Group Rorschach failed as a screening test in military selection and that a much larger per cent of *poor* responses were made by normal populations tested than was found by Harrower-Erickson. The present study is a further check on Wittson, Hunt and Older's results and provides comparisons between the Multiple Choice Rorschach Test and other personality disturbance screening tests.

The group of officers studied was chosen by unit commanders as a normative group to be used in a general study of officer candidates. These officers were to fit the criterion of "actually excellent officers" and were a highly selected group. All of them took the tests voluntarily and were assured anonymity. The test papers of each individual bore the same number for identification. Fifty-six excellent officers between ages 20 and 30 years, inclusive, were thus selected.

The entire enrollment of three officer candidate classes comprising 257 students also were examined. The candidates constituted a select group but were not as superior as the excellent officers.

In addition to the Multiple Choice Rorschach Test three other personality screening tests were given to these groups:

1. *Health Inventory* consisting of 38 self-rating items with particular reference to psychosomatic complaints. This is an unpublished scale devised by the senior author. The score consists of the number of *unhealthy* responses.

2. *Psychasthenic Inventory* consisting of 48 self-rating items taken from Part IV (Psychasthenia) of the Minnesota Multiphasic Personality Schedule (2). The score consists of the number of *unhelathy* responses.

3. *Group Level of Aspiration Test*, an unpublished pencil and paper test based on the individual level of aspiration personality test described by Rotter (3, 4). This test purports to measure such traits as aggressiveness, ambition, cautiousness, security, emotional stability and their opposites. Scores are given by assigning one of nine patterns to each record (4). These patterns are placed



for statistical treatment into three groups of *good*, *questionable* and *poor* for the purposes of this paper. The designation of *good*, *questionable* or *poor* refers to the adequacy of the personality traits characteristic of each pattern for actual or potential officers.

Clinical and some experimental evidence has shown these tests to be valid as screening devices for specific types of maladjustment but not for all maladjusted individuals. The Harrower-Erickson Multiple Choice Test purports to select from the general population "individuals with very different types of disturbances who might otherwise escape detection" (1, p. 341).

The same method of administration was used as described by Harrower-Erickson except that the Rorschach cards were projected on a screen by a balopticon.

TABLE I  
MULTIPLE CHOICE RORSCHACH SCORES FOR EXCELLENT OFFICERS AND FOR OFFICER CANDIDATES

Score	Excellent Officers		Officer Candidates	
	N	%	N	%
0	2	4	13	5
1	6	11	27	10
2	7	12	61	24
3	16	28	66	25
4	13	23	34	13
5	6	11	27	10
6	4	7	10	4
7	2	4	10	4
8			4	2
9			4	2
10			1	1
Total	56	100	257	100
Mean		3.4		3.2
Standard Deviation		1.6		1.9

*Findings.* Table I presents the distributions of poor or unhealthy responses on the Multiple Choice Rorschach Test along with the means and standard deviations for the excellent officer and officer candidate groups. Harrower-Erickson set four poor responses as the best critical score for initial screening purposes. That is, any individual with four or more unhealthy responses should be investigated for neuro-psychiatric disorder. Table I shows that 45 per cent of the excellent officers and 36 per cent of the officer candidates had four or more such responses. It is apparent that such high figures are incompatible with the highly selected nature of the groups studied. It should be noted that the superior group of officers had a higher incidence of unhealthy responses than did the officer candidates. These figures agree closely with those



reported by Wittson, Hunt and Older (5) for normal groups but vary widely from those reported by Harrower-Erickson (1). The findings of this study also are in keeping with an unpublished study by N. H. Kelley on the Multiple Choice Rorschach Test in the selection of candidates for nurses' training at the University of Louisville.

Although all types of unhealthy responses were common to the groups studied, color naming was particularly prominent, and failure to report anything was frequent.

TABLE II  
COMPARISON OF GOOD AND POOR MULTIPLE CHOICE RORSCHACH SCORES OF OFFICER CANDIDATES WITH OTHER PERSONALITY TEST SCORES

HEALTH INVENTORY				
<i>Rorschach</i> Score	<i>N</i>	<i>Mean</i>	<i>Standard Deviation</i>	
0- 3	167	4.6	3.3	
4-10	90	4.9	3.6	
PSYCHASTHENIC INVENTORY				
0- 3	167	6.5	4.8	
4-10	90	6.4	5.7	
LEVEL OF ASPIRATION				
		% <i>Good</i> <i>Patterns</i>	% <i>Questionable</i> <i>Patterns</i>	% <i>Poor</i> <i>Patterns</i>
0- 3	167	49	36	15
4-10	90	49	34	17

TABLE III  
COMPARISON OF GOOD AND POOR MULTIPLE CHOICE RORSCHACH SCORES OF EXCELLENT OFFICERS WITH OTHER PERSONALITY TEST SCORES

HEALTH INVENTORY				
<i>Rorschach</i> <i>Score</i>	<i>N</i>	<i>Mean</i>	<i>Standard Deviation</i>	
0- 3	31	4.8	4.5	
4-10	25	4.4	3.1	
PSYCHASTHENIC INVENTORY				
0- 3	31	6.9	6.2	
4-10	25	6.5	5.8	
LEVEL OF ASPIRATION				
		% <i>Good</i> <i>Patterns</i>	% <i>Questionable</i> <i>Patterns</i>	% <i>Poor</i> <i>Patterns</i>
0- 3	31	58	32	10
4-10	25	60	28	12



Comparisons of multiple choice scores with the three other personality tests used are given for officer candidates in Table II and for officers in Table III. No critical ratios between group means on the various tests are given since it is apparent from inspection that no differences approaching significance exist.

*Conclusions.* The Harrower-Erickson Multiple Choice Rorschach screening test was tried on 56 selected excellent officers and 257 officer candidates and the results compared with scores on three other personality screening tests. This test was found to be unsuitable with these groups.

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## BOOK REVIEWS

WECHSLER, D. *The measurement of adult intelligence* (3rd Ed.) Baltimore: Williams & Wilkins, 1944. Pp. vii + 258.

Since the review of the first edition of this book (Kent, G. H., *Psychol. Bull.*, 1940, 37, 251-4), two further editions have been published, the second in 1941, the third in 1944. The most recent revision, according to the author, emphasizes the military applications of the Wechsler-Bellevue Scale. It differs from the first edition largely in presenting more elaborate discussions of mental deterioration and differential neuropsychiatric diagnosis, and in making minor changes in procedure and scoring standards. The rationale behind the scale, the technique of standardizing test items, and the method of deriving and interpreting IQ's remain essentially the same as at the time of Kent's review.

Chapter 6 outlines a method for determining quantitatively, on the basis of a single administration of the Wechsler-Bellevue Scale, the degree of a subject's mental deterioration. Based on the assumption that abilities which do not decline with age in normal subjects are those least affected by deteriorative processes in psychosis, the method involves comparing a subject's mean score on the tests which hold up with age with his mean score on tests which do not hold up with age. "Normal" deterioration for each age group is given in terms of percent of loss, and a percentage greater than 20 ( $-2$  PE from mean of age group) is termed "definite deterioration." This use of obtained scores from age groups in the standardization population in measuring deterioration may be logical on a priori grounds. Whether the assumption that deterioration in psychiatric disorders follows that in senility is justified can be determined only through the application of Wechsler's technique to psychotic groups and comparison of clinical with psychometric findings. With the exception of one case study, however, no test of this assumption is reported.

Chapter 11, Diagnostic and Clinical Features, summarizes the author's impressions concerning the significance of a patient's relative performance on single subtests of the scale in the differential diagnosis of neurosis, organic brain disease, schizophrenia, psychopathy, and mental deficiency. Since the raw subtest scores expressed as weighted scores are directly comparable from test to test, it is possible to determine which subtest scores are relatively high and which relatively low for a single patient. Tables are given showing patterns of subtest scores for various clinical syndromes. The reader is told what constitutes a significant variation from subtest to subtest, and is provided with "rules of thumb" for determining diagnostically important variations, but evidence for the validity of such rules is not reported. Despite the facts outlined in Chapter 6, age is apparently not considered in this method of diagnosis.

The validity of differential diagnosis must depend upon demonstration of correspondence between inter-test variations and particular psychiatric disorders, preferably with large groups of carefully diagnosed patients, age controlled. No such analysis is presented by the author, who depends rather upon informal clinical experience in correlating pattern with syndrome. A cursory inspection of recent research on the use of the scale in diagnosis (as listed in Wechsler's bibliography) reveals that the impressionistic data found in the author's diagnostic tables are occasionally at variance with reported research results. Despite this fact, and despite Wechsler's own statement that "the data . . . are not intended, nor can they be used as psychometric short cuts to psychiatric diagnosis" (158), there are general statements throughout this







The critical reader will wonder what is to be gained by all this; the hypothesis is not novel, and the new arguments for it are not at all rigorous. Perhaps the best that can be said is that the hypothesis is sharpened and that the plethora of ingenious analogies may in some way make the idea appear more plausible. The author is aware of the logical weaknesses of his essay and suggests the experimental method as the final test.

*Experimental method* in this book seems to mean not only a logical test of the consequences of the hypothesis but also a laboratory test, a psychological experiment. Hence psychologists are likely to ask just how closely and in what sense the model is supposed to resemble the external process it imitates. Apparently not very closely, for in the only statements on this crucial issue which the reviewer could find the author says that the model has a "similar relation-structure to that of the process it imitates," and that the nervous system models the real process in the sense that it "permits trial of alternatives, in, e.g. bridge design, to proceed on a cheaper and smaller scale than if each bridge in turn were built and tried by sending a train over it, to see whether it was sufficiently strong." This is neither startling nor specific; the author explicitly refuses "to commit himself to a definite picture of the mechanisms of synaptic resistance, facilitation, etc."

All this book has to offer to psychologists, then, is the multitude of intriguing physical analogies for psychological phenomena.

DONALD M. JOHNSON.

*University of Illinois.*

GALLUP, G. H. *A guide to public opinion polls*. Princeton: Princeton Univ. Press, 1944. Pp. xviii + 104.

Perhaps no other division of quantitative social psychology has developed so rapidly and has been so vitally concerned with social and political behavior in the past decade as public opinion measurement. The almost unbelievable accuracy of the Swedish Gallup Institute in predicting a five-party division of the 1944 Swedish election with an average error of only 0.4 shows how far progress has been made. Naturally, many questions arise regarding polling methods, the function of polls, and interpretation of results, including, of course the familiar "why is it that I have never been polled?"

Since the publication in 1938 of the AIPO bulletin, "The New Science of Public Opinion Measurement," there has been no ready reference manual to satisfy a curious and meagerly informed scientific and lay public. Cantril's excellent *Gauging Public Opinion* (1943) supplies this for the former group; the present contribution of Gallup is intended to do this for the latter. The format of the small volume consists of twelve sections covering problems such as the cross section, interviewers and interviewing, polling accuracy, question formulation, measurement of intensity, polls and democratic process, election predictions, and miscellaneous problems. Within these divisions are listed series of questions in large type followed by discussions in text type. Typical questions are: "How many persons have to be included in a poll to obtain reliable results?" and "Don't polls oversimplify complicated questions?"

Though the orientation is predominantly AIPO, there are references to other methods and viewpoints. Roper's modified attitude scale and Likert's nondirective method are given attention, but the treatment of these and other measurement philosophies tends by necessity to be sketchy rather than critical or evaluative. The reviewer believes more attention could have been given to some of the newer developments such as 'filter' questions, pinpoint techniques,



the prestige factor, and the 'past preference' error (not mentioned). Perhaps the failure to relate certain of these factors to problems elsewhere touched upon in the volume, as the measurement of prestige to indicate direction and magnitude of bias in the sample, was deemed too technical for the lay reader, or it may be that the omission reflects the fact that many technical phases of opinion measurement are still in the experimental stage. A real omission occurs in the otherwise excellent treatment of the Digest poll failure (50). The author's review of causes does not isolate the critical cause which was that two systematic biases, *representation* and *participation*, operated during 1924, 1928, and 1932, in opposite directions and hence canceled out, whereas in 1936, one of these, *participation* (Democratic) reversed to pile up the error instead of canceling it out.

This volume will serve a real need in supplying information desired by everyone interested in social science. Opinion polls have become an established institution and an adjunct to democratic process, for better or for worse. No doubt there exists much misconception regarding their nature, functioning, and need; and the author's presentation may stimulate constructive criticism and more adequate evaluation. The author's treatment of sampling, and of the presumed 'band-wagon' influence, are especially commendable; likewise is his acknowledgement to persons identified with the development of opinion measurement. Even Congressmen could read the volume with profit.

NORMAN C. MEIER.

*University of Iowa.*



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## NOTES AND NEWS

KURT LEWIN, professor of child psychology in the Child Welfare Research Station, State University of Iowa, has resigned to accept a post in the Massachusetts Institute of Technology, where he will direct a research project in the field of industrial relations.

B. F. SKINNER, associate professor of psychology at the University of Minnesota, has been appointed professor of psychology and chairman of the department at Indiana University, to take effect Sept. 1, 1945.

FLORENCE L. GOODENOUGH, professor in the Institute of Child Welfare of the University of Minnesota, has been elected *Vice President* of the American Association for the Advancement of Science, and *Chairman* of the Section on Psychology for the calendar year 1945. HAROLD E. BURTT, professor of psychology, Ohio State University, has been elected *Secretary* of the Section for a four-year term.

EARL K. SEIBERT, formerly psychologist and director of guidance for the public schools of Belleville (N. J.), has been appointed director of student personnel, Green Mountain Junior College (Poultney, Vt.).

FRANCIS THEODORE PERKINS, assistant professor of psychology, Claremont (Calif.) Graduate School, has been promoted to an associate professorship.

CARL G. MILLER, dean of the College of Liberal Arts and professor of psychology at the University of Pennsylvania, has been reelected as *Secretary* of the Middle States Association of Colleges and Secondary Schools.

A grant has been made by the Sugar Research Foundation, New York City, to CURT P. RICHTER, psychobiologic laboratory, Johns Hopkins University, for investigation of the nutritive values of soft and raw sugars and of the carbohydrate-thiamine ratios taken by rats allowed free selection of all required nutrients.

HAROLD BORAAS has been appointed associate professor of psychology and education, St. Olaf College, Northfield, Minn.

JOHN ELDERKIN BELL, formerly assistant professor of psychology, Rochester (N. Y.) Institute of Technology, has been appointed associate professor of psychology, Clark University.

PETER. A. BERTOCCHI, associate professor of psychology, Bates College (Lewiston, Me.), has been appointed associate professor of philosophy, Boston University.

Applications to the Committee for Research in Problems of Sex, National Research Council, for financial aid during the fiscal year beginning July 1, in support of work on fundamental problems of sex and reproduction, should be received before April 1. They may be addressed to the chairman, DR. ROBERT M. YERKES, Yale School of Medicine, New Haven 11, Conn. Although hormonal investigations continue to command the interest and support of the committee, preference, in accordance with current policy, will ordinarily be given to proposals for the investigation of neurological, psychobiological, and behavioral problems of sex and reproduction.



A small book entitled *A Handbook for Old Age Counsellors*, by LILLIEN J. MARTIN has been printed by the Old Age Counselling Center, 1019-1020 Shreve Building, San Francisco 8, Calif., which Dr. Martin founded in 1929. This book is printed as a memorial to Dr. Martin and is distributed without charge on request at the Center to those persons or agencies interested in old age rehabilitation.

*Junior Internships.* Announcement is made of two junior internships in psychology which will be open in September, 1945, at the Western State Psychiatric Hospital in affiliation with the University of Pittsburgh under the immediate direction of DR. SAUL ROSENZWEIG. Either men or women with a Bachelor's degree from an accredited university who wish to obtain clinical and research experience with mental patients while pursuing course work at the University are eligible. The combined program, to be normally completed in one and one-half or two years, leads to a degree of Master of Science in Psychology. Full maintenance at the Hospital, including board, room and laundry, is provided; courses at the University may be taken at half-rate tuition (\$5 per semester credit). Appointments will be made for one year subject to renewal if requirements have been adequately met. Applications which must be submitted before May 15, 1945, should be sent to DR. GROSVENOR B. PEARSON, Director, Western State Psychiatric Hospital, Pittsburgh 13, Pa.

The following publications now available through the *American Society for the Hard of Hearing*, 1537-35th Street N.W., Washington 7, D. C., at 10 cents per copy, may be obtained by writing to that Society: *Helping the hard of hearing soldier at Deshon*, PHYLLIS MCCALMONT; *Plans for the rehabilitation of deafened service men*, HENRY T. MONCURE; *Progress report on the Army's program for the rehabilitation of the deafened*, MAJOR WALTER E. BARTON, M.C.; *Recreation in the programs for the rehabilitation of the hard of hearing at Deshon General Hospital*, SARA BOMBERG; *The Navy's program for rehabilitation of the war deafened*, CAPTAIN FREDERICK A. JOSTES, U.S.N.R.; *The Veterans Administration program for the vocational rehabilitation of sensory handicapped veterans of World War II*, ALBERT E. CROFT, and *War damaged ears*, LAURA STOVEL.

The Policyholders Service Bureau of the Metropolitan Life Insurance Company is issuing the second in a series of studies on the subject of veteran employment, entitled *Re-employment of war veterans*. This discusses many of the problems in store for employers who contemplate the re-employment of discharged servicemen. Findings are limited to those questions which will be the concern of management in its planning for the postwar period. Of special interest are sections on demobilization plans, the U. S. Army's separation procedure, and Government agencies serving the veterans, both in the United States and Canada. The greater part of the report deals with company programs to meet postwar needs. The programs of several companies are outlined. Orders for this booklet may be placed with the Policyholders Service Bureau, Metropolitan Life Insurance Company, One Madison Avenue, New York City.



# Psychological Bulletin

## A SYSTEMATIC TREATMENT OF JUDGMENT

DONALD M. JOHNSON

*University of Illinois*

The concept of judgment has had a long and interesting history in psychology and logic. The variety of meanings carried by this term is disclosed by Hollingworth's (50) review of the traditional definitions of judgment and by Weber's (111) later questionnaire study of its usage by psychologists and logicians. The topic of this paper can best be delimited, however, by making explicit the usage of modern experimental psychology.

In many situations—in the laboratory and out—a person is called upon to decide between two or more alternatives or categories of response. The alternatives may be in the perceived situation or they may be reproduced from memory. Or, as in complex problem situations, the alternatives may be hypotheses or tentative solutions which result from a prolonged search, and judgment of the alternatives in these cases comes in as one phase of the larger enterprise of problem solving.\* As differentiated from other higher mental processes judgment is decisive, not productive. It is decisive in a functional sense in that it closes an episode of deliberation and permits the resumption of other kinds of activity. It is not productive since nothing new is added to the perceived situation as by imagination, memory or generalization. Treating judgment in this way is, of course, a device of systematization which skips over some of the niceties of traditional usage. It does accord with the practice of experimental psychology and with the usage of at least one respectable logician, for Dewey (27) speaks of judgment throughout his recent book as "settlement of a problematic situation."

Approaching the topic with this orientation this paper attempts to organize the literature on judgment, describing some of the methods in present use, the assumptions commonly made, and summarizing in general terms some of the achievements already at hand. The first section takes up the independent variables of judgment, the materials, factors or stimulus objects on which the judgment is based. Following this is a section on the dependent variables, categories of response, confidence

\* In a previous review in this *Bulletin* (62) the elaboration of solutions to a problem was discussed at some length, but judgment of alternative solutions was left for this paper.



and time of judgment. Finally, individual differences in these various phases of the topic are brought together.

## I. INDEPENDENT VARIABLES OF JUDGMENT

Some important conditions of judgment, such as attention and motivation, will not be discussed here. Attention is obviously important in any intellectual activity; one cannot judge an issue if he cannot attend to it. But the role of attention in problem solving has been considered in the previous paper, and the same considerations apply to judgment. The motivation of an act of judgment—as it is treated in the literature—seems to be similar to the motivation of any other activity, and the activity continues until the motivation is reduced, whether by a decision which clarifies the situation or by some less logical change. Blumenfeld (9, pp. 168–173) has a discussion of this problem in which he considers a variety of occasions for judgment. He is not able to come to any very specific conclusions, however. The independent variables of judgment which have been investigated most thoroughly are the stimulus materials to which the response is related. Studies on this phase of judgment can easily be divided into two groups: those dealing with simple judgments and those dealing with complex judgments.

### A. Simple Judgments

In many laboratory experiments the objects of judgment vary only (or mainly) along a single dimension or continuum, and it is this aspect of the objects which is judged. It is relatively easy in these judgments to isolate and attend to the aspect or quality designated in the instructions. Simple judgments can be grouped for later reference into three large classes on the basis of the aspect or characteristic of the stimulus objects which is to be judged.

Some of the most valuable data on judgment come from *perceptual* judgments. In these the observer attends to and judges some perceived aspect of the stimulus objects: color, loudness, breadth, distance, etc. The rationale of the psychophysical methods is, in large part, an attempt to control the peculiarities of the judging process, or to balance them out experimentally or statistically, so that the results can be clearly related to the perceptual mechanisms. It is precisely these peculiarities of judgment, e.g., constant errors, which concern us in this paper; psychophysical research will be mentioned only when it illuminates the judging process in general. And since under some conditions perceptual judgment becomes a matter of simple perceptual discrimination, it is necessary to outline a theory of discrimination developed by Landahl, one of Rashevsky's students at Chicago.

Landahl (70) begins with Rashevsky's two-factor theory of neural excitation which states that the excitation factor increases at a rate proportional to the



excitation and decays at a rate proportional to its own concentration. He further assumes that the excitation is a logarithmic function of the intensity of the stimulus divided by the stimulus threshold. Then he sets up a model beginning with two sensory pathways and ending with two response pathways. Between these are four connecting pathways making synaptic junction, one excitatory and one inhibitory to each. By making simple assumptions Landahl can write an expression for the preponderance of excitation in one response pathway over the other as a function of relative stimulus intensities.

He then introduces the concept of "random distribution of distracting stimuli" at a synapse. Working with a symmetrical distribution of these distracting stimuli, he comes out with the probability, for certain cases, of responses such as *greater*, *less* and *equals*. Thus he can take two values from a weight-lifting experiment published by Guilford and compute the other values with fair accuracy.

In a later paper (71) Landahl extends the theory to complex stimuli—including non-physical stimuli—and thus is led to the possibility of factor analysis for separating factors producing the total excitation at the two pathways. These deductions have been based on the assumption that the stimuli are operating simultaneously. To take account of delayed discrimination Landahl (72) uses a more complex model of neural pathways which includes a set of self-exciting neural circuits of low thresholds.

Householder (51, 52), also a Rashevsky student, attempts a similar problem, namely, to describe—within the framework of mathematical biophysics—a mechanism by which differences in intensity of stimulation are sifted into different sets of neural pathways and thus produce different responses.

The chief contribution of these papers is, of course, methodological. The authors are more interested in exploring the potentialities of mathematical biophysics than in settling any particular problem. A diligent reader of these mathematical essays will be intrigued by the possibilities of ignoring the details and speculating on the grand scale, and will perhaps find his attention directed to concepts which are more fundamental than those usually attacked in psychophysical experimentation. The idea of a "random distribution of distracting stimuli," to mention one, will come up again in these pages by one name or another. As electrophysiological research advances, it is likely that threshold phenomena, receptor functions, and the like, which Landahl and Householder are forced to guess at, will be analyzed experimentally, and that theoretical speculation and empirical data can draw closer together. Already some data on the relation between electrical activity in the muscles and judgments of lifted weights are available (40, 88).

Experiments on *affective* judgments have contributed a large share of present knowledge of the psychology of judgment. In these the observer reports on his likes and dislikes, how pleasant or unpleasant the stimulus object is to him, how badly he wants something, how strongly he reacts for or against something. The older experiments in this field used colors, musical intervals, odors and forms. More recently faces, words, activities, slogans and the like have been included. The term "affective" is used also in a narrow, more precise sense; in the broad sense used here it



comes close to "personal," as opposed to impersonal or objective. The variety of materials on which such judgments have been made may be seen in Young's (116, pp. 270-292) recent summary. Such judgments are easily made; in fact we shall see that they are often made when other kinds of judgment are called for.

A third class of judgments, *abstract* judgments, may be distinguished, in which attention is directed to abstract or conceptual properties of the stimulus objects, and the judgments are made on this basis. In a library, for example, the cataloger who has to decide whether to list a new title, say *Growth of American Thought*, under history, philosophy or genetic psychology is making such an abstract judgment. The judge in a court of law who rules on the admissibility of evidence supplies another illustration. In studies of personality judges are often asked to rate people on such abstract qualities as social usefulness and honesty and to rate occupations on a scale of prestige. These judgments are sometimes difficult and, if we may go by the research on syllogistic judgments as summarized by Woodworth (115, pp. 810-817), a large share of the difficulty is due to the very abstractness of the material.

Refined quantitative research on abstract judgment is meager. As with other kinds of judgment the first problem is one of stimulus control. Our understanding of perceptual mechanisms has been facilitated by the availability of a wide range of stimuli, accurately controlled and suitably spaced along the stimulus continuum. Recent developments in the scaling of attitude items have two important implications for the psychology of judgment. Firstly, they show that the judges who aid in the construction of a Thurstone-type attitude scale—educated adults with an interest in the task—are able to conceive an abstract stimulus continuum, e.g. favorableness of the item toward Communism, to compare items in this respect, and even to sort the items directly in accordance with their location on the abstract continuum. They are able to attend to this abstract aspect of the item in spite of interference from other aspects, foreign to the attitude continuum, and even from the personal acceptability of the item (32, 48, 89). Furthermore, the scale values derived from abstract judgments made in various ways are rather closely related (33, 93), a fact which rules out the possibility that these scale values are artifacts. The judges are judging some genuine abstract content of the items. Secondly, these scaling procedures solve the problem of stimulus control for abstract judgments. They make possible the manufacture of stimulus material to definite specifications in regard to ambiguity and location on a conceptual or ideational continuum. While these scaling procedures have had their chief application in the construction of attitude scales, there seems to be no good reason, *a priori*, why any abstract quality at all, however subtle, cannot be manipulated in the same way. A minor limitation is that the scale values are derived



from the consensus of a group and may not be precisely valid for any one individual.

Abstract material prepared in this way has been used in a few experiments on judgment. Chant and Salter (21) used Droba's scale of attitude toward war to show the relation between difficulty of a judgment and the galvanic skin reflex. Johnson (60) used such material to study the relation between confidence in a judgment and distance from the category threshold. Cartwright (18) had his subjects scale names in respect to radicalism-conservatism in order to get stimulus material for a study of decision time. McGarvey (80) had her subjects scale occupations in respect to prestige and certain forms of behavior in respect to undesirability in order to study the anchoring of the scales. Mosier (84) has scaled over 200 adjectives from the Thorndike Word List on a scale of favorableness-unfavorableness. The results of these studies will be considered later in a systematic way.

The question which logically arises at this point is: What is the mechanism by which these abstract judgments are made? In this form the question has not been attacked, but it is part of the general problem of the psychology of learning, and some of the recent work on generalization and differentiation, on stimulus equivalence and the like shows the path where the answer may be found. The method used in studying the generalization of a scale of values (63) also offers suggestions.

### *B. Complex Judgments*

Under this heading come investigations in which the objects of judgment vary in many ways, and the judgments are made in respect to some rather general criterion. Such judgments occur in many practical situations—more frequently of course than the simple judgments—as when teachers grade students' schoolwork, when inspectors sort mechanical products, when farmers judge corn at the county fair, when an employer sizes up a job-seeker, when the voters pick a public official, and when a judge or jury decides the fate of a defendant. Studies of the independent variables involved in these complex judgments can be reviewed under two subheadings: identification and weighting of the variables, and interaction among the variables.

*Identification and Weighting.* Much of experimental psychology is devoted to an analysis of the independent variables or factors which determine a specific response, but our concern here is with general principles of judgment, even though tentative, which can be extracted from the experimental literature.

One such principle, almost obvious, is that *the judge may not be able to point to the factors by which his judgments are determined.* A corollary to this is that a psychologist designing an experiment may not be able to predict his subjects' responses on the basis of logical relationships between the independent variables and the response. This principle is not at all new, and no sophisticated psychologist expects people to be completely rational. It is mentioned here only for the



sake of completeness, since the principle is enthusiastically rediscovered from time to time.

A second principle is that *the judgment may be determined by an independent variable which the subject is not aware of even when his attention is directed to it.* It is now well established that, under some conditions, people can respond with an accuracy above chance levels to subliminal stimuli, i.e. to stimuli which have been reduced in intensity below the conscious threshold (5, 82, 113). Furthermore, Bressler's (11) experiment on the debated question of the effectiveness of the Müller-Lyer illusion when the radiating lines are subliminal seems to prove that these accessory subliminal stimuli influence the judgment of the main object of attention. It has been suggested (85, p. 163) that our immediate intuitive judgments of personality are based in part on such subliminal cues, subliminal in a perceptual sense or in the sense that they depend on memory impressions too faint to reach the conscious level.

Our third generalization must be stated tentatively: *if the judgment called for is difficult, judgment in terms of some other criterion is likely.* Thornton (104) showed that, when college students are shown a photograph and asked to rate the person as to various personality traits—an almost impossible task—a person smiling is likely to be rated higher in honesty than the same person not smiling, and a person wearing glasses is likely to be rated higher in intelligence, dependability, industriousness and honesty than the same person not wearing glasses. In a further study Thornton (105) found that the effect of the glasses was less when the actual people were seen than when slides of these people were shown. As the author suggests, these factors "will have decreasing effect upon judgments of personality traits as the number of other cues upon which judgments may be made increases." In line with this principle is the limitation on the effects of suggestion (22, 74) and on the effects of one's desires (16, 81) when the situation is well structured, i.e. when judgment is easy.

Our fourth generalization, which could be considered a special case of the third, is that *when an abstract judgment is called for, an affective judgment is commonly given.* This phenomenon is regularly observed in judgment of the controversial issues of the day, since these are abstract and difficult, and the content is usually affective. Laboratory evidence is also available (16, 77, 81). In his original study Lund (77) attempted to weight the importance of desire and of evidence in the determination of the judgment, and he reports a correlation of .81 between degree of desire and degree of belief, to be compared with a correlation of .64 between degree of knowledge and degree of belief. "Degree of knowledge" here means merely how often the group stated that their belief was based on knowledge rather than opinion, hence these correlations cannot be taken as indicating the relative weight of these two variables in the judgment. Bird (8) has written a critical discussion of this kind of research.

A fifth principle relates to the source of the material. *In general people are likely to weight positively material which comes from, or is attributed to, someone whom they respect* (4, 76, 92). Lurie (78) reverses the procedure and uses this effect as a measure of prestige. The relative weight of majority and expert opinion in determining judgment of controversial issues has been studied under various conditions (14, 69, 79, 83).

Probably other generalizations could be extracted from the experimental literature. Social psychologists have compared the relative weights of emotional and rational material and of various modes of presentation of the material. Of more fundamental significance for the present review would be an experimental study of primacy and recency.



Would a given factor weigh more heavily in the final decision if it is introduced early in the course of deliberation or late?

The methodology of these studies is important. It is comparatively easy by several methods to determine that such and such a factor has some bearing on the judgment. To determine in any general sense the relative weight of several factors is much more difficult. For example, to compare judgments made after exposure to emotional and to rational material, or judgments based on knowledge and on desire, it is necessary to assume that each kind of material used in the experiment is an equally potent representative of its class, i.e. that the rational material is as rational as the emotional material is emotional. If this assumption is not justified, the conclusions may still be useful in a limited way but must be greatly restricted in generality. It is now possible by the scaling procedures mentioned above to make a more precise approach to these problems. If the stimulus material can be located on a scale of rationality, or desirability, or authoritativeness, refined comparisons or correlations can be made.

The correlational technique seems to offer a means to weightings of some degree of generality. It has been used to analyze both perceptual and abstract judgments.

Brunswik (13) has been using the correlational technique on the old psychophysical problem of size constancy. He used a representative sample of objects encountered by one subject as she went about her daily routine, and had the subject make judgments about these objects under several different instructions. If we take as our problem the determination of the judgments of the size of the objects—which was not Brunswik's main concern—we can get some good information from his correlation coefficients. From his Table 5 it appears that the net relationship between estimates of size and actual or "geographic" size was .98, while that between estimates and size of the retinal projections was .40. Brunswik goes on to show, on the basis of his "ecological" sample, that the perceptual system is better adapted for judging distal stimuli (objects in the environment) than proximal stimuli (retinal objects) which mediate the distal judgments.

Osgood and Stagner (87) used the correlational method for analysis of judgments of prestige. They obtained ratings for the prestige of fifteen common occupations, and also ratings for hopefulness, honesty, idealism, hours of work and the like for the same occupations. They then correlated the ratings for these qualities with the ratings for prestige and found that the ratings for hopefulness were high, showing a correlation of .99 with prestige, while ratings for hours of work were low, with a correlation of .20. A similar analysis of the prestige of the people in these occupations was also carried out. Taking these correlations as evidence of the specific factors on which the general judgment was based it may be concluded that "qualities like brains, leadership and self-assurance are shown as marks of prestige" while "honesty, idealism and congeniality are not."

The ideal of this type of analysis—though no one has carried it that far—appears to be a multiple regression equation, identifying and weighting all the variables which have significant effects on the judgment.



ment. The limitations of the correlation technique are well known to-day, and even in 1918 Thorndike (101) in a paper called *Fundamental Theorems in Judging Men* was calling attention to non-linear relations between the independent variables and the judgment. The competent impressionistic or intuitive judge of men, he said, takes these complexities into account, hence the strength of the intuitive judgment, as compared with the more formal types, is that it is more quantitative! In spite of these limitations the correlation technique has a definite value if it leads to a good first approximation and narrows the field of subse-

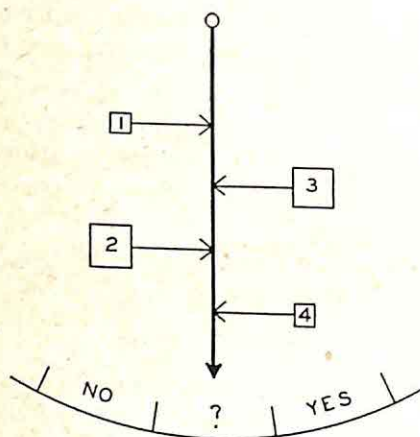


FIG. 1. Illustrating some of the possible modes of interaction of the independent variables which determine a judgment. The numbered arrows indicate stimulus variables, forces, factors, etc. The scale at the bottom is made up of the categories of response. This figure specifically represents the assumption that the response is a result of the algebraic summation of the various contributing factors.

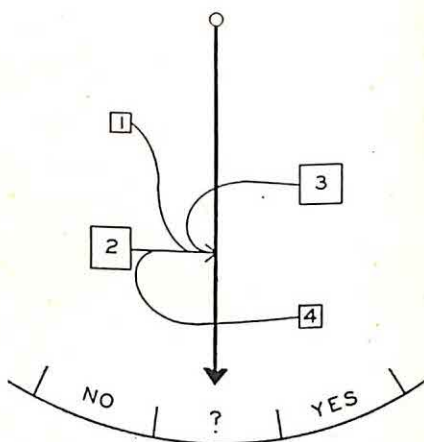


FIG. 2. Judgment on the basis of general impression. Variable No. 2 sets up the general impression and the other variables reinforce, or at least do not oppose this impression. This is illustrated by the *halo effect* and the *atmosphere effect*.

quent inquiry. A more detailed analysis waits for an understanding of the interaction which takes place among the independent variables.

*Modes of Interaction.* If we knew what variables were involved in a complex judgment, and their approximate weights, we would next like to know something of the dynamics of the process: How do these variables cooperate in producing the judgment? The most obvious mode of interaction, one that is often assumed implicitly, is *summation*. It is possible that, under some conditions at least, all factors which influence the judgment exert their influence in the same way, and the judgment is, therefore, the algebraic resultant of these separate pushes and pulls. Figure 1 attempts to illustrate this mode of interaction.



Since psychometric frequency functions are similar to the integral of the normal probability function, it is often assumed, as by Boring (10), that simple psychophysical judgment depends upon the additive interaction, presumably at the neural level, of a multitude of independent varying "dispositions." Landahl (70) makes this assumption also when he adds the excitation from the sensory apparatus to the excitation produced by the "random distracting stimuli." Whether this assumption or summation at the neural level is justified or not, we find similar assumptions at the psychological level. Mosier (84), for example, in introducing his "psychometric study of meaning," writes a hypothetical equation for meaning (expressed by judgments of words in terms of favorableness-unfavorableness) as the sum of "that part of the meaning which may be taken as constant from one person and one context to another," "the part which varies from one individual to another" and "the portion of the meaning which is due to the context." Cartwright and Festinger (20) in their topological theory of decision likewise assume simple algebraic summation of opposing psychological forces. Max Eastman (28) in his thoughtful discussion of humor makes a slightly different assumption: "The two kinds of drollery, the pun and the mischievous fancy, fuse into a whole that is more comical than the sum of the comicalities of each" (p. 111). "Remember that two humor sources welded together yield more humor than the sum of their two separate yields" (p. 314).

The only critical test of this assumption, as far as the writer can discover, consists of a few studies of affective judgments. The method has been to get ratings of two stimulus objects, e.g. color cards, separately and in combination and to correlate these sets of ratings. Beebe-Center (7) has summarized the evidence, from which it appears that this method is not strictly adequate because the result of juxtaposing the separate stimuli may be, not a combination, but a new configuration. When the separate stimuli are "heterogeneous," as when the object is judged separately for form and for color, the method is more adequate and leads to the conclusion that "the hedonic tone of the composite phenomenon varies more or less directly with the hedonic tone corresponding to the single stimuli" (p. 122). This is not summation in any precise mathematical meaning; one cannot compute the rating of the composite by adding the ratings of the components. Greater refinement of the rating scale or some other way of estimating the strength of the contributing factors is necessary before any satisfactory answer to this question can be obtained.

One can argue that summation is likely under some conditions and that it may be assumed as a first approximation for a mathematical theory—of simple judgments at least. In addition one must recognize the occurrence of other modes of interaction. Perhaps as a reaction to the implicit assumption of summation there has been an emphasis in the literature recently on the *structure* of the situation which is judged. This term, or something similar, is a convenient one for interpreting the formation and shifting of attitudes, but its usage is usually negative in the sense that it is an admission of failure of the assumption that the attitude can be interpreted as the summation of the various pros and cons



into which the issue can be analyzed. Another difficulty with the emphasis on structure is that it may be putting the cart before the horse. Since the judgment, once arrived at, restructures the subject's beliefs and actions, he could readily report—and be himself convinced—that the restructuring determined his judgment. In spite of these criticisms there are at least two kinds of structuring, or non-additive modes of interaction, which can be described with some definiteness.

Judgment on the basis of *general impression* is one type of interaction in which summation cannot be assumed. The situation is restructured and the separate facts of the case, instead of being separately evaluated, are integrated behind one dominant fact or general impression. In other words, the case is pre-judged on the basis of one dominant factor, and the other factors contribute only by reinforcing, or at least not opposing, the dominant factor. Figure 2 is an attempt to represent this interaction schematically.

The best-known example of this phenomenon is the "halo effect" as it appears in judgments of personality. The halo effect has been widely discussed; it is sufficient here to quote Gordon Allport's (2) comments.

The halo effect appears with monotonous uniformity in nearly all studies of ratings, and its magnitude is often surprising great. The judge seems intent on reporting his final opinion of the strength, weakness, merit, or demerit of the personality as a whole, rather than on giving as discriminating a rating as possible for each separate characteristic. Whenever the variables have moral connotation the halo effect is larger, for it is a striking fact that a general attitude of approval or disapproval toward the subject colors every single judgment concerning his single vices and virtues. The halo effect is also large when any single variable is not easily observed in action or when it is ill-defined; in such cases the judge substitutes his general impression for the variable that he cannot rate directly.

The halo has considerable theoretical significance. Its existence is proof positive that in perceiving and reflecting upon a personality we rapidly structure our impressions into a self-consistent totality. The structuring is far more rigid and coherent than it should be. Though it dulls our discriminative capacity it demonstrates for us one of the essential characteristics of intuitive knowledge, namely, its tendency toward totalized structures (p. 447).

This concept has worked its way into the technical psychological literature and even into the elementary textbooks, but anyone who looks for clear-cut evidence on the halo effect is certain to be disappointed. The evidence usually given comes from correlations between ratings of personality traits since confusion between the separate traits and the general impression will increase the correlation between the separate traits. Recently the correlations have been subjected to factor analysis. In one instance (30) factor analysis of an industrial merit rating scale of twelve separate characteristics showed that almost all of the variance of the whole scale could be accounted for (after rotation) by one factor, which the authors therefore called "ability to do the present job." The difficulty with such evidence is that it is based on correlations between



ratings are ambiguous. It is not easy to decide whether the correlation is the result of a confusion in the mind of the rater or of an objective relationship within the variables being rated. Thorndike (102), in a paper published in 1920, attempted to show that the objective relationship accounts for only part of the correlation, as follows:

It is known from abundant evidence that technical ability as a flyer is a rather highly specialized quality. Considering the restricted range of the aviation cadets, the correlation between general ability for officer work and technical ability as a flyer could hardly be above .40, without any attenuation. As attenuated by the imperfections of the rater's knowledge of both, it could hardly be above .25. Yet the correlations for the eight raters studied in this respect are .74, .85, .52, .91, .63, .72, .47 and .53, an average of .67. Obviously a halo of general merit is extended to influence the rating for the special ability, or vice versa (p. 27).

This sort of argument is at least plausible and can be taken as proof of the halo effect if one is willing to accept Thorndike's estimate of the objective correlation.

Symonds (99) approached this problem with the partial correlation technique in an attempt to eliminate the effect of the general impression and thus to ascertain its importance. He had two teachers rate their pupils on seven personality traits. The correlations between their ratings ranged from .19 for orderliness to .47 for honesty, with a mean of .39. A composite rating was obtained by adding the seven separate ratings for each pupil, and this composite was taken as each teacher's general impression. He then computed partial correlations of the second order to find the relation between the two ratings of each separate trait with the influence of each teacher's general impression partialled out. The resulting coefficients ranged from  $-.04$  to  $.55$ , with a mean of  $.15$ . The mean difference of  $.24$  is taken as an indication of the halo effect, and Symonds says that "the halo effect which heretofore has been merely assumed is here demonstrated to be a reality." He goes on to compare one trait with another in respect to this measure and tentatively assigns certain reasons why one trait shows more halo than another. These reasons have often been cited.

Yet this argument is open to the same criticism as the others, namely, that the correlation may be in the people rather than in the rating process. If Symonds had begun with objective test scores, a similar set of correlations might have been obtained. The correlations between the separate test scores would be considered reliability coefficients and the correlations between each test and the battery would be considered a measure of the influence of the general factor in each test. The reliability of each test would, of course, be lowered when the general factor is partialled out. Hence it is not necessary to assume any halo effect to account for these results.

Thus it appears that the evidence for the halo effect is rather thin. Although everyone who has had any experience with ratings of personality acknowledges the importance of this phenomenon, it would be well to have objective data on its incidence and amount. The best technique, the writer would suggest, is manipulation of the procedure of judging



rather than manipulation of the data obtained by one procedure. Symonds' (99) suggestion that all persons be rated for one trait at a time ought to reduce the effect of the general impression, and a comparison of the correlations obtained in this way with those obtained by the customary procedure would be quite clear-cut. Such a comparison apparently has not been published.

Other illustrations of, and more satisfactory evidence for judgment on the basis of general impression, come from studies of the "atmosphere effect" in judging syllogisms and from research on attitudes.

Sells, (95) technique in verifying the effect of the atmosphere or general impression was, in contrast to the above, not to try to remove it or weight it, but to use it in predicting judgments. He assumed that judgment of the validity of the conclusion of a syllogism depends on the atmosphere created by the premises as well as the logical relations of the premises. Negative premises set up a negative atmosphere. Affirmative premises set up an affirmative atmosphere. And conclusions in agreement with the atmosphere thus set up are likely to be accepted. There are complications, but specific predictions can be made from the atmosphere of the premises. Sells presented syllogisms with a large percentage of invalid conclusions to a group of educated adults and found that of these invalid conclusions those in agreement with his predictions were accepted much more often than the others.

Evidence of another kind for the importance of the general impression comes from a study by Asch, Block and Hertzman (4) in which the judging procedure was experimentally manipulated. In one part of this study they had college students rank ten professions according to six characteristics, such as intelligence and social usefulness. The correlations among these rankings were positive and of medium size. Next, they introduced a group or majority standard similar to the subjects' own standards by printing on the blanks the mean rankings for intelligence obtained from a similar sample of students. This operated to raise the intercorrelations slightly, presumably by strengthening the subjects' general impression of each occupation. A fictitious standard was introduced in the next experiment, one which was very different from the mean rankings of the previous sample. The intercorrelations produced under the influence of this unconvincing standard were definitely lower and some were negative, presumably because the general impression had been destroyed. Further studies with other kinds of material, such as photographs, names of political figures, and slogans yielded rather clear-cut evidence for the importance of a general attitude underlying judgment of the specific items.

The effect of a stereotype may be considered an example of judgment on the basis of a general impression, certainly so if we accept Edwards' (29) definition: "A stereotype is a stimulus which arouses standardized preconceptions which are influential in determining one's response to the stimulus." This definition is stated in terms of the judging process,



and Edwards recommends its adoption in place of Lippmann's original "standardized picture in the head." (One should remember, however, that what Lippmann was trying to emphasize by his picturesque term was not the judgment process but the astonishing durability of the general preconception in spite of inconsistent specific data.)

A third mode of interaction—which also emphasizes the structure of the situation—can be identified, in which some of the contributing factors are integrated into a *context* or background, and the remaining factors make their contributions within this context. Consider a case at law as an illustration. A man starts a fight on the street. A policeman accuses him of disturbing the peace and brings him before a judge. The judge's decision will take into account the background of the act, the time of day, the events leading up to the act, the occupation of the accused, his reputation, and so on. These facts of the case are not summed, obviously. Certain facts, meanings, implications, connotations, associations, etc. are admitted to judgment. Others are thrown out. The data admitted are organized into a context, and within this context or frame of reference\* the act is judged. Other examples need not be cited. The strategy of painting a background against which a proposition or client appears in a favorable light is widely used by public relations counselors, debaters, defense attorneys and political campaign managers. Cantril (17), in constructing a systematic framework for his analysis of social movements, devotes a chapter to "the individual's mental context" wherein he discusses such problems as how the values of the culture are "interiorized" and how the ego gets involved in the context. Figure 3 is intended to illustrate this mode of interaction.

Clear-cut data on the context of judgment are hard to find. Context is usually brought in after the fact as an interpretation of a shift of judgment or of individual differences. But an interesting example of one way in which the context may be changed comes from an attitude study by Asch (3). As one phase of this study he had two samples of students from the same college population rank ten occupations in respect to intelligence, social usefulness, and the like. They were given, "as an illustration," the ranking of politics by a group of 500 college students. For one group this fictitious ranking of politics was 1, for the other it was 10, and the resulting rankings showed the usual susceptibility to majority opinion. But the important point is that, when they were asked what politicians they had in mind while making the judgments, the first group used phrases like "more statesmanship than politics," while the second group spoke of the "usual neighborhood politicians." One can explain

\* The term, "context" is used here rather than "frame of reference" as it is narrower in meaning and easier to define. "Frame of reference" has a number of meanings in psychology; in fact it is sometimes used to include phenomena which are discussed in the next section under the heading of "response scale."



such evidence away, to be sure, as *ex post facto* rationalizations for the influence of suggestion. But the statements of the subjects sound too specific for this simple interpretation. They imply that the subjects used the two standards to establish two different contexts within which the occupation of politics is judged. Or, as Asch put it, they "so interpreted the object of judgment as to make the standard reasonable." From a similar experiment on the changing of attitudes by Lewis (74) we can get further illustrations of the operation of context. In interpreting her

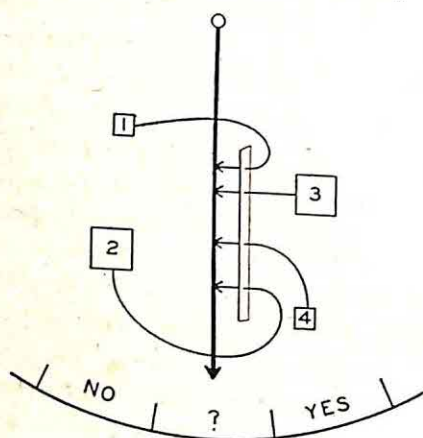


FIG. 3. In the mode of interaction illustrated by this figure the variables of the judgment are assumed to be structured by a context or frame of reference within which they operate.

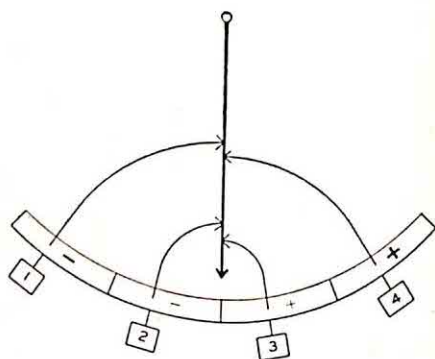


FIG. 4. Illustrating the special case of judgment of simple uniform stimulus objects in which there is no context other than the range of stimuli presented. The context of judgment and the response scale are formally equivalent. An example is the psychophysical judgment by the method of Single Stimuli.

results she says that the source of the statement functions to supply context for the statement, and change of opinion depends on whether "the new pattern thus created seems at least as clear and correct as the old." In Cantril's (17) terminology this illustrates the "individual in pursuit of meaning."

No doubt there are many other ways of structuring and restructuring the facts of the case. Blumenfeld (9, 184-188), in his comprehensive 1931 treatise on judgment prints a tentative schema of insightful operations on the situation to be clarified. His main headings are analysis of the material, combination of independent data, and reconstruction of the perceived situation as a whole. There are several subheadings under each of these. Blumenfeld also emphasizes the role of doubt in changing the structure of the situation, and, in the interests of completeness, one should point out that the deliberate doubtful judge may carry out all kinds of operations on the material at hand in accordance with his train-



ing and motivation. Right here is the line—as the writer interprets the trend of research on the higher mental processes—between judgment and problem solving. When a person who is forced to make a choice from a number of alternative ways of responding, instead of dealing directly with the facts of the case as they are presented to him by his perceptual, affective or memory apparatus, invents some new (to him) organization of the data, devises some new solution, or institutes a search for some other way out of the problematic situation, the process is a more complex one, and goes by the name of problem solving.

## II. DEPENDENT VARIABLES OF JUDGMENT

The judgment—which concludes the judging episode—may be expressed in action, as when the individual takes the right road rather than the left, or it may be communicated to another person by a word or other symbol, or it may merely be registered in memory as a belief or guide to subsequent action. The experimental evidence deals largely with verbal expressions of judgment, though the relation between words and actions has come in for some discussion in connection with attitude measurement (85, pp. 889-912).

It is in accord with the present status of psychological research and also with the notion of judgment as settlement of a problematic situation to note that all judgments are relative, and that they are expressed in relation to alternative categories of response or in relation to response scales. Analysis in these terms is, and has been, very revealing so long as the operations of the psychologist are not confused with the operations of the judge. Judgment in categories is illustrated by a student taking a true-false test or judging the items on an attitude test. The problem solver may judge a hypothesis "plausible." The poet may judge his product "incomplete." (Hence, as noted earlier, the judging process may be a final or an intermediary phase of problem solving.) Adjectives such as heavy, red, true, unpleasant and illegal, when used to express a judgment, are relative in the sense that their use is influenced by the other available categories of response and by the judge's understanding of the limits of the categories. Since judgments are, by definition, made in at least two categories, e.g. X and not -X, and since these categories can be treated as forming a response scale of at least two categories, it is profitable to reverse the history of psychology and consider judgment on a scale as the prototype.

### *A. The Response Scale*

Judgments of stimulus objects one by one in "absolute" units—the method of Single Stimuli—express the position of the objects of thought on a scale. The scale may be a well-known scale, familiar to many, as when judgments are made in inches or minutes, or when handwriting



samples are judged as 5th, 6th or 7th grade quality. Or it may be peculiar to the individual judge, lasting perhaps only for the duration of one experiment, as when he judges weights as #1, #2 and #3 or judges personality traits as -2, -1, 0, +1 and +2. Practical suggestions regarding the use of such rating scales are given in the textbooks on personality and industrial psychology and in general treatments of psychological measurement. Our concern here is the more fundamental question of how these scales are developed and used.

In contrast to context, scales are easy to work with for they are simple and one-dimensional, while the context may be multi-dimensional. Our definition of judgment implies that the response is simpler than the stimulus-situation. But some confusion between the context of judgment and the scale of judgment is possible, since both are often considered in discussions of the frame of reference. This can be clarified by taking up again our previous illustration of the man who was accused of disturbing the peace. Let us say that, within the context which the judge has constructed from the facts of the case, he has judged the man guilty. Now the judge has to pronounce sentence. The severity of the sentence is more than a matter of context. It depends on whether the judge calls the offense *very serious*, *serious*, *minor* or *trivial*, in other words, where the offense falls on the judge's scale of the seriousness of crimes. Thus we see that the context determines what independent variables or factors are considered in the judgment and what force they will have. The scale determines the category of response by which the judgment is expressed. This distinction is clear for complex judgments which are determined by a variety of independent variables. In the special case of judgments of simple uniform material, e.g. a series of weights, there is no context other than the range of the stimuli, hence context and scale amount to the same thing. (See Figure 4.) Such simple material is not suitable for investigating the operation of the context or frame of reference in a complex judgment, but is suitable for analysis of the operation of a response scale.

It is important to note also that a figure-and-ground effect occurs here. The object or act being judged may stand out as figure, and will be attended to and remembered. The objects in the background, the experiences on which the scale of judgment is based are usually taken for granted and are not brought out in the subject's report of the factors by which the judgment was determined.

Experimental investigation of a response scale requires, of course, that the scale be described quantitatively. The quantitative description of a response scale in units of the stimulus variable is easily accomplished by simple calculations based on the frequency of use of the categories along the scale. For example, if the stimuli are lines measured in millimeters and the response categories are *longer* and *shorter*, conventional



psychophysical calculations, as for the method of Constant Stimuli, yield a statistical limen or boundary between these categories in millimeters. If a standard stimulus is used for comparison, this value is called the "point of subjective equality" or PSE. If no standard is used, this point is merely a boundary between adjacent regions of a scale. And, if no standard is used, the method is a general one which can be used to describe a scale of any number of categories in terms of transition points or boundaries between any two adjacent regions. Blumenfeld (9, pp. 393-467) has published an exhaustive analysis of scales of two, three, five and ten categories, including computation of limens between categories (Trennfugen), category widths, asymmetry, overlapping and the like. Similarly, any one category, e.g. *equal* or *mellow* or *moderately bitter*, can be separately studied so as to get a quantitative definition of the concept involved in relation to the remaining categories, the instructions and other experimental conditions. Cartwright (18) has used such a procedure in determining "ranges of equivalence" for words.

If we raise the question *How does the judge acquire his scale of judgment?* the answer must be that he learns it. Certainly it is not an innate characteristic of the perceptual apparatus. The best data on such learning come, not from the use of a well-established scale of inches or minutes but from experiments in which the subject develops and uses a new scale in a controlled situation. Whether they are asked to rate the pleasantness of color cards on a seven-point scale, or to judge weights as *one*, *two* and *three* (112), or to judge the irregularity of a scattering of points on a ten-category scale (9), or to judge the meaning of words on an eleven-category scale (84), people are able to adapt to such scales quickly. The evidence for this is that they make their judgments readily, using all categories with some degree of consistency and uniformity. The presentation of low stimulus values lowers the scale; high values raise it. Hence, as a first approximation, we may say that, at least with *ad hoc* scales based on experience with a uniform series of stimuli, the response scale is co-extensive with the range of stimuli used in an experiment. Hunt and Volkman (55, p. 88) have put it as follows:

The position and the width of this scale are determined by the position of the group of stimuli and by the stimulus-range which the group covers. In general, when the group of stimuli is moved up or down upon the stimulus-continuum, the absolute scale moves with it; when the group of stimuli expands or contracts, the scale likewise expands or contracts. There is still variability of judgment, but the general position of the scale is determined. Under these conditions, it seems appropriate to speak of the scale as being *anchored* by the stimuli.

A recent paper by Johnson (63) begins at this point and attempts to describe the relation between the experience with the stimulus objects and the scale which is thus learned. He takes the lifting and judging of a weight as a unit of practice with that weight. On the basis of a mathe-



mathematical discussion of the organization of a scale—starting with what is known about generalization along a stimulus continuum—he assumes that the practice effects may be averaged to determine the location of the center of the scale. Although, in the absence of empirical data, he is forced to assume a questionable equation for the receptor function which delivers the effects which are averaged, his predicted category boundaries for scales of two and of four categories agree quite well with experimental values obtained from a variety of stimulus distributions.

In this investigation all the stimuli were similar. It is another question how similar the stimuli must be in order that their effects will be organized into a common scale of judgment. The question in this form has not been investigated, but the previous discussion of summation may be pertinent. In an incidental way it has been reported (63) that a scale organized around lifting laboratory weights is not displaced noticeably by other kinds of lifting, such as lighting a cigarette and shifting a chair.

The scales of judgment used outside the laboratory show irregularities, e.g. the "round number" effect, here and there. In a psychological scale of warmth the "physiological zero" probably exerts a special influence. There are a number of experiments in which the scale of judgment has been experimentally manipulated so that modifications of the scale and their relation to the presented stimuli can be observed.

Blumenfeld (9, pp. 393-406) was interested in a variety of scale which may have some significance for ratings of personality, namely, a scale which is anchored at one end by an imaginary or ideal limit. His stimuli were scatterings of points to be judged for regularity. There is no apparent limit to the irregularity of the points, but the limit of regularity would be reached when the points all lie in a straight line. He has considerable evidence which emphasizes the importance of this ideal limit. The subjects judged these point figures by imagining a lower limit of zero irregularity and anchored their scales at this end. The category next to the ideal limit was smaller than those farther away. It is likely that our daily value judgments are made on a scale which is anchored at some such ideal reference point. Blumenfeld mentions the concept of normality in this connection. Scales in which the categories are percentages, and other scales which are bounded by zero and unity, are probably anchored at both ends. This end-anchoring would appear to yield an advantage in respect of inter-individual consistency which has not been exploited in practice.

The effect of end-anchoring can be easily demonstrated, and the details can be studied by the use of an extreme magnitude, real or imaginary, as an anchoring stimulus. Presentation of an extreme value extends the scale, hence subsequent judgments are expressed in less extreme categories. This holds for inclinations of lines (91, 109), for pleasantness of colors (55), for weights (91), for the prestige of occupations and the undesirability of certain forms of behavior (80). The effect of the extreme value is a systematic one, which influences all category limens, usually broadening the categories (80, 91). Since this phenomenon has been demonstrated in judgments on many kinds of material, perceptual, affective and abstract, it may be taken as a general principle of judgment (53, 80).

Ratings are often made with standards or models in view, as in grading fruit



and rating handwriting. These standards act as anchoring values, tying down the scale at certain points along the stimulus continuum. Blumenfeld (9, pp. 436-448) compared the judgments which result when such standards are given as types, each one representing the type or center of a category, and when they are given as limits or boundaries of the categories. His results lead him to favor the use of limits rather than types but, as he points out, the evidence is not clear-cut. In the light of the prevailing custom of designing rating scales with descriptive phrases at the centers of the categories this is still an important practical question.

Not only can the ends of a scale be extended, as we have seen, but the scale can be condensed in some regions and expanded in others by suitable stimulus presentations (75). Variability of judgment depends in part upon stimulus density, i.e. the number of stimuli per unit of stimulus range (54, 110).

It is obvious from the above that there is a definite advantage in treating the categories of judgment as regions of a scale; hence we shall mention only one illustration of how this modern enlightenment clears up an old psychological problem, namely, the problem of the judgment of emotional expression. It has been recognized for some time that the words used in naming facial expressions are not logically exclusive and that measures of accuracy of naming based on that assumption are too rigid. Attempts were made to solve the problem by grouping the names into several broad categories, but this is merely a logical procedure which does not yield a unique solution. Woodworth (115, pp. 249-252) went a step farther and aligned the groups into a scale of six broad categories. The alignment makes sense in respect to the scattering of judgments and permits the calculation of a defensible correlation between stimulus and response. Schlosberg (94) has analyzed judgments obtained by the use of this scale in more detail and finds much overlap between the sixth category and the first. This leads to the conclusion that the scale is a recurrent one, probably elliptical rather than circular. Thus clarity is brought into a chaotic field, and the experimental results can now be given a rational treatment.

The *comparative judgment*, as it is usually carried out, is best understood as a special case of judgment on a scale. The scale is established by the series of comparison stimuli; the standard is an anchoring stimulus which holds down the middle of the scale. Although comparison with the standard is emphasized by the customary instructions, several investigators have called attention from time to time to the "absolute" impression obtained from a single stimulus as a result of its position in the series of comparison stimuli. Hollingworth's (49) work on "the inaccuracy of movement," in which he found that constant errors in the reproduction of extents by hand movements increased with the extension of the series limits, led him to emphasize the "central tendency" of the series in the determination of the indifference point. Ipsen (56), working with a series of Sander's figures, had his subjects estimate the ratio of one diagonal to the other and found that the equivalence value



did not coincide with either central tendency (mean or median) of the objective stimulus values, but as the mean varied the equivalence value varied in the same direction. It was this effect of the series, confused in the comparative judgment with the effect of the standard, which led to the more recent studies by the method of Single Stimuli mentioned above.

Another old psychological problem which has been settled by recent knowledge of the scale of judgment is the problem of the middle category in the comparative judgment: Shall the subject be permitted to say *equal* and *doubtful*, or shall a definite choice one way or the other be required? The early discussions of this topic centered around the distinctness of the impression of equality. When this criterion was set aside and the *equal* response treated as the middle category of a three-category scale, the whole problem was clarified. The problem became one of the variability of the width of the middle category and the vulnerability of this width to attitudinal changes. Dependable quantitative data are available on the question when put in this form (18, 35), and the methodological implications have been adequately discussed (115, pp. 421-425).

If we go further and attempt to apply our knowledge of the organization of a scale to the comparative judgment in a systematic way, we come out with some interesting results. Suppose we have five comparison stimuli, weights of 92, 96, 100, 104 and 108 grams, to be compared with a standard of 100 grams. As the experiment proceeds, the subject will soon be judging each comparison stimulus in relation, not to the standard alone, but to the central tendency of the scale built up by experience with all the weights. Now, if we assume that the central tendency of the scale can be computed by averaging the central effects of experience with the stimuli—an assumption which has some empirical support (63)—and, furthermore, if we make the usual assumption that the receptor function is a logarithmic one, it will turn out that the PSE will always be lower than the standard stimulus because the standard is set at the arithmetic mean of the series and the geometric mean is always lower than the arithmetic mean. In other words, a negative constant error will occur whenever a scale is organized around an average of the effects delivered by a receptor function of decreasing slope. Negative constant errors are commonly found in psychophysical judgments, most consistently in judgments of weights and of intensities of sound. It is noteworthy that the receptor function for both of these modalities is usually assumed to be a logarithmic one, or something similar.

It is easy to compute the constant error by these principles. Instead of assuming a logarithmic receptor function and computing a geometric mean we shall assume the modified logarithmic function previously found useful for lifted weights (63). If the standard is not judged, but merely observed, it can be left out of the calculations. Computing the central tendency, then, for the



five stimuli of our above example we get 98 grams, which will be the PSE. If the standard is included in the calculations once for each comparison stimulus, we compute the central tendency of ten stimuli, which comes out as 99 grams. These two values may be taken as the limits within which the PSE will fluctuate in accordance with the relative attention value of the standard. The PSE usually obtained for weights of this range does vary around these limits. It usually decreases a little, as one would expect if the attention value of the standard decreases in comparison to the series effect. If we assume that, for the experiment as a whole, the standard has an attention value half that of a comparison stimulus, we can weight the calculations accordingly and get a single value for the PSE. In this example it will be 98.6 grams.

Wever and Zener (112) used a series of weights of 88, 92, 96, 100 and 104 grams with the standard at 100 instead of at the midvalue of 96. A general theory should predict the results from this unusual arrangement, however. If we carry through the computations in the above manner, we get a PSE for this arrangement of 96.1. The mean PSE for their six subjects is 96.7. They also publish results for two subjects with a wider range of comparison stimuli and the same unusual standard. Our method of computation gives a PSE of 95.2 for such a series, and the two values given by Wever and Zener are 95.3 and 96.7. If we combine these two values with eight PSE's published by Fernberger (36) for the same series, we get a mean PSE of 95.2 grams. This agrees, as well as one could wish, with the theoretical value.

It turns out, therefore, from this discussion of a constant error in the comparative judgment—which is often called the “time error”—that there is a genuine advantage in treating the comparative judgment systematically as a special case of judgment in reference to a scale. We hasten to add, however, that there is more to the “time error” than this. A negative constant error, which is properly called a “time error,” is produced by the order of presentation of standard and variables and is covered up by the customary balanced method of presentation. It may be brought out by comparing the judgments when the comparison stimulus is given before the standard and when it is given after the standard. Woodrow (114) attacked the whole question of the effects of the standard by systematically using a wide range of different standards. He found that he could separate the obtained errors into two parts, and could account for these errors by postulating two tendencies: “first, one producing a negative error throughout, independently of the weight of the standard; and secondly, one causing increasingly positive or negative errors with increase in the difference between the weight of a standard and the middle or average weight of all the standards” (p. 403).

The first tendency is not clarified by the present discussion. It is presumably a neurological phenomenon, and has been attributed to the “fading” or “sinking” of the effects of stimulation. It is the second tendency, the “central tendency,” empirically observed throughout the history of psychophysics and attributed to such principles as “set” and “assimilation,” which may now be supplied—if the above discussion is correct—with a rational explanation and a method of computation.



*B. Confidence, Time and Difficulty*

Looking at judgment as settlement of a problematic situation we can interpret a report of the confidence felt in a judgment as a report of how problematic the situation remains after the judgment is delivered. In fact judgment can be defined in terms of confidence in the result (50), or at least differentiated from certain other processes. Learning experiments can be arranged so that confidence increases as the situation becomes less problematic (64, 103).

Confidence and time of judgment are easily recorded. The scale for reporting confidence runs from zero confidence, "a pure guess," to complete confidence, "100% certainty." Frequency distributions of such reports are J- or U-shape (96, pp. 26-27) because the scale is anchored at the two extremes. Occasionally the scale may be anchored in the middle also (59, pp. 39-41). These irregularities in the confidence scale raise difficulties in the quantitative treatment of confidence reports, but quantitative data are available and their consistency argues for their validity.

Many experimenters at various times have asked for reports of confidence, usually after comparative judgments on psychophysical material, and it is now well recognized that confidence in the two-category judgment increases with an increase in the physical difference between the stimuli being compared. It has recently been determined (37, 59) that the relation between confidence and the stimulus variable is an ogive, similar in shape to the usual relative frequency function but of more gradual slope. Volkmann has similar curves (unpublished) for the three-category judgment. Johnson (59) makes the generalization, suggested by Volkmann, that *confidence increases as a function of distance from a category threshold*. In general, any change in the stimulus material which increases accuracy of judgment increases confidence in the judgment (41, 43, 59). This follows from the statement above that the confidence report is an indication of how problematic the situation remains. Constant errors complicate this relation sometimes (59, pp. 41-44). Under some conditions the relation is reversible: Those judgments given with most confidence are the most accurate (15). Curiously, speeding up the judgments by instructions to emphasize speed rather than accuracy has no significant effect on confidence, at least not for judgments of weights (41) or of lengths of lines (37, 59).

Time of judgment has been studied occasionally—perhaps because of the analogy with reaction time, although in judgment the emphasis is on accuracy rather than speed and the times are much longer. Working with brightness comparisons Kellogg (66) plotted time functions on the stimulus variable separately for each category of judgment and thus showed that "the psychometric time curves for all categories tend to be inversions of the psychometric frequency curves." He also plotted time



on the stimulus variable for all categories of response. This curve, of course, is highest near the point of objective stimulus equality and decreases on both sides of this point, as stimulus-difference increases. On the basis of these curves Kellogg could make the generalization that "within any given category of judgment, the more the stimuli deviate from the ideally perfect condition typified by the category name, the longer the judgment-times tend to become." Similar curves for other kinds of material and similar generalizations have since been published (18, 59). Since it is difficult to locate the "ideally perfect condition" on the scale, it is preferable to state this generalization in relation to a point which can be located, as follows: *Judgment time decreases as a function of distance from a category threshold* (59). This relation is a general one which holds for a scale of affective value as well as physical value (6, 21, 25).

Cartwright (18, 19) has attempted to interpret results of this sort in terms of "differentiation of the phenomenal field"—a Lewinian concept. Instead of "category threshold" he speaks of a "border of a range of equivalence," and he presents data from a variety of ingenious experiments to demonstrate how a range of equivalence can be broadened and narrowed by the experimental conditions. Considering a range of equivalence as a region of the phenomenal field Cartwright goes on to say that the subject, in his attempt to be right, will set up certain forces related to the alternatives in the phenomenal field, and that decision time is a resultant of the conflict between these forces. Since conflict arises and judgment is prolonged when the stimulus falls upon a boundary of a region in the phenomenal field, judgment time will depend upon the differentiation of the phenomenal field.

In the writer's opinion Cartwright falls into a minor error when he confuses the number of categories of the scale with the differentiation of the field. He cites Kellogg's experiment—the one mentioned above—in which the mean judgment time for the three-category judgment was 10% greater than for the two-category judgment as having general implications. Suppose, however, that the subject is judging a series of three stimuli, evenly spaced, instead of seven that Kellogg used. It is quite likely that the two-category judgment would be the slower one on the average with such a stimulus range—and with many other ranges which could be set up. Differentiation of the field must be defined in terms of what the subject is trying to do.

In a later series of papers Cartwright and Festinger (20, 37, 38) put forth a mathematical theory of these conflicting forces which determine the decision time. The forces are not quantitatively specified except in the sense that the resultant of two opposing forces is normally distributed in time around a mean value. To prevent a decision from occurring on the basis of only a slight imbalance of the opposing forces the authors introduce "restraining forces" with normal distribution about a mean value. A decision occurs only when the resultant of the opposing forces is greater than the restraining forces of the moment. The probability of different categories of decision can now be written in terms of these postulated forces. Taking several convenient values for the mean restraining force they draw theoretical curves for relative frequency of response and for decision time as functions of mean resultant force. They are thus able to derive several semi-quantitative tendencies of judgment which check quite well with a variety of empirical data. A more precise check necessitates tying



the hypothetical resultant force to empirical data in some way. This is done by the statement—called an operational statement—that confidence is a linear function of mean resultant force and may be used as a measure of it. Hence they come to a plot of the relation between time of judgment and confidence for different magnitudes of the restraining force (imposed by different instructions).

It is difficult to evaluate the fit of the theoretical curves which Cartwright and Festinger draw over their empirical data. Certainly in Figures 1a, 1b, 1c, 2b, 3 and 4 (38) the departures from the theoretical curves are not random. They suggest a peak near the point of zero confidence, i.e. near the category threshold, similar to curves previously published (59, p. 42), rather than the flat-top curve which the theory requires. But this is a detail; on the positive side is the important fact that they can calculate constants from the results obtained under one kind of instructions and find that they hold for other kinds of instructions. All in all, while they have not given their theory a rigid test—as they claim—they have taken a big step in drawing together a number of experimental findings into a coherent theory, showing that a quantitative theory about the higher mental processes is possible and profitable.

The relation between the time required for judgment and the confidence expressed in the judgment has been taken seriously, and we can make the generalization for any person judging a wide range of any kind of material, i.e. both large and small stimulus-differences, that those judgments which are given most quickly will be given with most confidence. Seward (96) studied this relation by the correlation technique, using recognition judgments of fancy papers. Her correlations for many subjects ranged from .37 to .81 with a median of .65. This technique, of course, assumes a linear relationship. Two attempts have been made to determine just what the form of the relation is. Volkmann (108), on the basis of judgments of inclinations of lines, published a tentative equation in hyperbolic form. Johnson's (59) equation, which fits the data on judgments of three kinds of material fairly well, is in logarithmic form: "As doubt or uncertainty increases arithmetically, judgment time increases geometrically." The departures from these simple equations are chiefly in the region of the threshold when the large degree of doubt may lead to a complication in method of reaching a decision, e.g. "a giving-up." It is still a question whether doubt is the cause of long judgment times, or the result.

Although we know in a general way that confidence and time are each related to the difficulty of a judgment, precise analysis is lacking because of the difficulty of getting accurate measures of difficulty. Any careful analysis requires measures of difficulty which are valid for the person making the judgments. In the absence of this measure difficulty has been measured in terms of a social criterion, namely, the percentage of persons failing an item. And it is known that under some conditions felt difficulty is related to this social criterion in a logarithmic way (45). Items which are more difficult in this sense are judged with lower confi-



dence (47), with more muscular activity (26), and with a greater drop in palmar skin resistance (39).

It is a safe generalization that several dependent variables are related to distance along the scale from the category threshold: confidence, time, difficulty, and effort as measured by muscle activity and skin resistance. Therefore, when one category of judgment is given with more confidence (1, 60, 96, 98) or less time (21, 66, 73, 86, 96) or greater GSR (21, 73) than another, an adequate interpretation of the results is not possible unless this distance from the category threshold is considered. The old problem of the relation between atypical opinion and confidence has been taken up again from this point of view (60).

Blumenfeld (9, pp. 189-192, 484-488) has been particularly interested in the vacillation or oscillation (Schwanken) which enters the judging process along with doubt. His interpretation is based on comments of his subjects while judging his point figures and his observations of their behavior. To illustrate this vacillation which occurs when neither opposing force is strong relative to the other he refers frequently to the analogy with a pendulum. Since some sort of vacillation is commonly mentioned in the literature on judgment, the pendulum analogy is included in the figures which accompany this article.

According to Blumenfeld we incline now to one side and now to the other, under the influence of opposing forces of approximately the same strength, and finally one attains a preponderance. The pendulum system is damped somehow, and Blumenfeld suggests the time of judgment as a measure of the damping of the energy system under certain simple conditions. Actually, while the swaying continues, the forces are changing as a result of incoming perception, accidents or information. Reconstructions are occasionally so made that the whole energy system is deformed. If doubt continues, and the activity becomes annoying, the judgment may be evaded, a frivolous decision may be made, or the categories of response may be changed so as to make judgment easier.

Doubt may be objectively observed, according to Blumenfeld. The lips are shoved forward and backward. The hands beat time. The fingers make drumming movements. The head or trunk bends this way and that. The brow is wrinkled. The lips bite together. He measured the time of oscillation for a few subjects as they expressed it by tapping. The times varied from three to seven seconds. He suggests the possibility of a personal constant of decision analogous to the law of small pendulum oscillations. Changes, after the decision has once been announced, are made when doubt is great. In fact Blumenfeld has some examples of rapid forgetting of the announced judgment, presumably because it was immediately reversed. And some of his subjects said that the judgment had been "extorted" from them, probably because they happened to make the judgment just at the moment when the pendulum was at the limit of its swing.

On this topic Blumenfeld's objective evidence is quite casual. He has relied mainly on introspective data, which are as suspect here as elsewhere, especially in respect to a report of time relations. No one would deny that such vacillation occurs, and there is some objective evidence that judgment times are longer for those choices during which the sub-



ject looked back and forth between the alternatives (68), but this phenomenon is more parsimoniously interpreted by statistical principles, i.e. in terms of the cumulation of variations in the effects of the stimulus variables, or of a "random distribution of distracting stimuli" (70), or of variations in the opposing forces and the restraining forces (20).

### III. INDIVIDUAL DIFFERENCES IN JUDGMENT

Studies of individual differences have not often been directed toward judgment as distinct from other intellectual processes. Individual differences in attitudes, for instance, have usually been related to cultural background, personality and the like, only occasionally and incidentally to the details of judging. There may be significant individual differences, however, in any of the aspects of judgment discussed in this paper. What are called "types of thinking" may upon investigation turn out in many cases to be merely differences in the weight attached to various kinds of material. Presumably the theoretically-minded man—if there is such a man—weights a general principle heavier in making up his mind than the practically-minded man does. In the relative weight carried by emotional and rational factors one would expect to find large differences between cultures and from time to time within the intellectual history of one culture. For example, a careful reader of Curti's recent *Growth of American Thought* (24) could plot the long-time trends in this weighting over a period of three centuries. The more skillful advertisers and propagandists recognize such differences and adjust the rationality of their appeals to the level of their audiences. Individual differences in the intrusion of affective material into an abstract judgment are tested on the Watson-Glaser Test of Critical Thinking (42).

Suggestibility has been studied for some time, and adequate summaries of the literature are available (8, 85). One of the chief topics of investigation has been the question of generality versus specificity. In the present paper we have seen that there are many principles of judgment which operate independently of the material on which the judgments are made. This would lead one to expect some degree of consistency of suggestibility from one kind of judgment to another. On the other hand it has been necessary to treat suggestion in two ways, in terms of the weight attached to a source, and in terms of a restructuring of a situation. Putting these two hints together one would expect to find a moderate degree of generality on tests of suggestibility, and this is in fact what the latest summaries indicate. Subsequent papers support this conclusion (23, 34, 90).

Consistent individual variations in the organization and use of a scale have occasionally been reported. Mosier (84) noted in an incidental way in his "psychometric study of meaning" that there was among his subjects "a tendency to mark words either at the extremes, or



toward the neutral value." Guilford and Jorgensen (46), when analyzing frequency distributions of affective judgments on a nine-category scale, observed "that for the same individual the shape of the curve is decidedly constant whether he is rating colors or color combinations." Examining the use of a seven-point scale in an attitude study Osgood (86) discovered that some people used 1 and 7 almost exclusively, others used only 1, 4, and 7, while others used the entire scale. "Preliminary analysis of these data indicates that these differences are related to occupation, education, and intelligence, the more critical thinkers making a more discriminatory use of the entire scale." If a tendency of this kind can be established with certainty, it would be a matter of decisive importance in interpreting the results of experiments using ratings. For instance Singer and Young (97) found correlations as high as .53 between affective judgments on various kinds of material, a correlation which some would take as evidence for a general hedonic factor, but they preferred to explain it as due to "some consistent manner of using the rating scale." At present both interpretations are plausible. Certainly differences in generalizing ability enter into such judgments, but how they would show up in the judgments is not known.

Individual differences in confidence in a judgment are easily and reliably measured (59, 60, 61, 67), and some evidence from intercorrelations on generality of confidence in judgments of different kinds of material has been reported (58, 59, 60, 61, 67, 106). The amount of generality under favorable conditions is indicated by mean intercorrelations in the .50's and .60's. Bi-factor analysis (61) of confidence scores on eight vocabulary tests allotted 48% of the variance to the general factor. The general factor of vocabulary achievement accounted for only 27% of the variance.

Klein and Schoenfeld (67) repeated Johnson's (59) experiment on generality of confidence *with* and *without* emphasis on the personal significance of the tasks to the subjects. In the first condition, which they call "ego-involvement," the mean intercorrelation was .45; in the second it was .22. This is an important result. It ties up with the recent attempts to increase the validity of personality tests by the use of the stress situation and with a recent discussion of studies of level of aspiration by Irwin (57). Irwin noted that levels of aspiration, or expectation, were more closely related to actual performance for "realistic" than for "unrealistic" situations, and that the figures for generality of aspiration are higher for the unrealistic than for the realistic situations. If we examine the nature of the situations and the instructions given, we can equate realistic with objective or impersonal and unrealistic with personal and arrive at a generalization which applies to the discussions of both Irwin and Klein and Schoenfeld: When the tasks are of personal significance, with a high degree of ego-involvement, both expectation



before the performance and confidence after the performance will show a higher degree of generality from one task to another than when the tasks are impersonal. In impersonal tasks both expectation and confidence will be more closely related to the objective situation. The reason for this is that reports of both expectation and confidence are judgments, and the objective situation differs from one task to another while the ego factors which contribute to a judgment of performance level remain relatively constant.

In the mental-test situation individual differences in confidence in a judgment are not closely related to intelligence or performance (43, 61, 106). Confidence enters the picture in another way, however. Gritten (44) has shown that, when students taking a multiple-choice test are told to answer only the questions they are sure of, i.e. not to guess, the more confident ones will attempt more items and will get more right. The conventional correction—which might be called a correction for variations in confidence—is fairly adequate in removing the advantage.

On attitude tests an extremist is likely to express his opinions with relatively high confidence (1, 16, 31, 60), partly because his position on most issues is far from his category threshold. He therefore has less need to deliberate than the troubled middle-of-the-roader. A group is more confident (60), as a group, and also faster (86), in dealing with those issues on which there is a majority, and will deliberate longer before taking a position on neutral statements (21). Similarly, group agreement in a judgment correlates with reported ease of the individuals making the judgment (65).

The generality of speed of judgment has attracted some attention. Since judgment is slow, impeding the "congenial pace" of the individual, one would expect that some people would be more eager, as a general rule, to bring judgment to a close than others. Blumenfeld's suggestion of a personal constant of vacillation has been mentioned. Early empirical studies (12, 107) were largely negative for generality. Symonds (100) has summarized the research on the speed-of-decision items on the Downey Will-Temperament Test. Average intercorrelations ranged from .25 to .60. Johnson (59) used more adequate timing and found rather high intercorrelations: .79, .84 and .91. He used only three tasks, however. The conclusion for speed is the same as for confidence: Present results indicate at least a moderate degree of consistency from one kind of judgment to another.

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# PSYCHOLOGY AND THE WAR

Edited by  
DONALD G. MARQUIS

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## THE OFFICE OF PSYCHOLOGICAL PERSONNEL

Report for the Year 1944

DONALD G. MARQUIS

At the end of its third year of operation, the Office of Psychological Personnel has reached a certain degree of stability in its functions in spite of the rapidly changing conditions of wartime. The Office was created by recommendation of the Emergency Committee in Psychology in February 1942 to promote the maximum effective utilization of psychology and psychologists in the war effort. It has operated under the administrative supervision of the Division of Anthropology and Psychology of the National Research Council which also provided office space and facilities in its building at 2101 Constitution Avenue, Washington 25, D. C.

It is expected that the Office of Psychological Personnel will cease to exist at the end of 1945, when its activities will be assumed by the newly created Office of the Executive Secretary of the reorganized American Psychological Association. Looking ahead to this shift, the Office of Psychological Personnel has accepted an increasing participation in the professional activities of psychology and has cooperated in the work of several of the active committees of the national societies. The Director of the Office of Psychological Personnel has joined with the Secretary and Business Manager of the APA and the Executive Secretary of the AAAP in formulating a statement of possible functions of the Office of the Executive Secretary. This statement will be presented to the Council of Representatives of the APA at the September meeting and will be available for the use of the Executive Secretary when he takes office.



## PSYCHOLOGISTS IN THE ARMED SERVICES

During the course of the year there has been a noticeable shift in the nature of psychological work in the Army and Navy. The original demand for job analysis and for personnel selection and classification procedures has been satisfied in large part, and many psychologists have been transferred to duties in the analysis and design of training procedures and in clinical psychology. New programs have developed in the rehabilitation of military prisoners, in the special training of the inept, in the evaluation of combat effectiveness, in special researches in the theaters of operation, in the redistribution of personnel returned from combat duty, in the hospital services for disabled, and in the discharge (separation) counseling.

Relatively few psychologists have been inducted through Selective Service during the year. The available supply had been pretty well exhausted and the new class of 18 year olds does not, of course, include any psychologists. The urgent demand for young combat troops in the spring of the year resulted in the cancellation of occupational deferment for most psychologists under 26. The Office of Psychological Personnel continued to help new inductees obtain classification for psychological duties, and to assist others in obtaining commissions.

Direct commissions for enlisted psychologists with clinical training and experience became available during the latter half of the year in a developing program of hospital service jointly administered by the Surgeon General and the Adjutant General. The OPP responded to a request for information about all qualified psychologists, and furnished similar recommendations in connection with several other less extensive opportunities for direct commissions.

In spite of the corrective reassignments and increased quotas for commissions, complete utilization of professional psychologists in the Armed Forces still has not been realized. Approximately one tenth of those with Ph.D. training are not officers, and many with somewhat less training are not assigned to psychological duty. The high priority of assignment to Ground Forces this year has meant that any psychologists who for one reason or another found themselves in Infantry or Artillery were out of reach of any measures to reclaim them for research or psychological duties in other branches of the Army. These problems, and others concerned with the role of psychologists in the military organization, were the subject of study and recommendation by a series of conferences of military psychologists called by Dr. Robert M. Yerkes at the National Research Council.

## PSYCHOLOGISTS IN FEDERAL AGENCIES

The Office of Psychological Personnel has continued to consult with



the Government departments and war agencies needing psychological service, and to assist in locating personnel for their programs. A few of the sections employing psychologists have been curtailed; more have found that the limited personnel available has served to restrict their expansion.

The Civil Service Commission, looking ahead to the enormous employment task after the war, has organized a Test Development Section, with Thomas Bransford as Chief. Approximately 15 psychologists have been employed to date, and it is expected that others will be added to the staff as the work develops.

The number of psychologists engaged in various projects in the Office of Strategic Services has increased almost twofold during the year. Approximately half of them are in the Armed Forces. The Office of the Chief Engineer, War Department, has requested lists of qualified industrial psychologists throughout the country who would be available for consultation on regional personnel problems.

The progress of the war has resulted in a reduction in the work of the Surveys Division of the Office of Civilian Requirements, War Production Board, and Helen Peak has replaced E. R. Hilgard as Chief. Dwight Chapman has transferred to the Census Bureau to develop new lines of work in special surveys and attitude studies for other Government agencies. The Office of War Information has reduced the work of its domestic branch, including the special services in which several psychologists were engaged. There are about half a dozen psychologists in the overseas branch, working in the Washington, New York, London and Paris offices. Leonard Doob has been made Chief of Policy Coordination as well as Chief of the Bureau of Overseas Intelligence. In the Division of Program Surveys, Department of Agriculture, Angus Campbell is acting as Chief in the absence of Rensis Likert, who is on an overseas research project for the War Department.

Approximately 140 psychologists are now employed in war projects associated with the Office of Scientific Research and Development. The National Research Council's Committee on Selection and Training of Aircraft Pilots employs 19 others on its various researches.

The Office of Vocational Rehabilitation, Federal Security Administration, in its expanding program has added several psychologists to the Washington staff in the Vocational and the Research Divisions, and a few others have already been engaged in the operating program at the State level.

The greatest potential demand for psychologists is in the Veterans Administration. Four psychologists are now engaged in the planning and supervising functions of the Vocational Rehabilitation Division of the central headquarters and others have taken positions in the voca-



tional advisement work of the regional offices in some ten states. There has been steady progress in the establishment of decentralized vocational counseling centers in the colleges and universities of the country. In August the Office of Psychological Personnel issued to department chairmen a 7-page newsletter describing the newly created program and discussing the opportunity for contract services by colleges. Copies of this newsletter may be obtained from the Office on request.

### JOB REFERRAL SERVICES

Requests from prospective employers were received this year in comparable frequency with the previous year. Table I presents an analysis of these requests and the outcome as determined by a follow-up inquiry.

TABLE I  
ANALYSIS OF JOB REQUESTS  
1944

<i>Employer</i>	<i>Total requests</i>	<i>For information or no placement made</i>	<i>Placement made</i>	<i>Placement from OPP referrals</i>
Colleges, universities	81	41	40	16 (17 individuals)
Industries, consulting or organizations	20	12	8	3
Schools	6	2	4	1
Clinics, guidance centers	25	11	14	6
State hospitals, other institutions	19	15	4	3
Public personnel agencies	7	4	3	3 (4 individuals)
Federal war agencies	21	14	7	6
Other federal agencies	11	5	6	4 (10 individuals)
War research projects (OSRD, NDRC, CMR, NRC)	8	1	7	4 (24 individuals)
<i>Totals</i>	198	105	93	46 (74 individuals)

Because of the acute shortage of qualified and experienced psychologists no attempt has been made to promote an increased employment of psychologists in jobs not directly concerned with war activities. Anyone who is available to consider a change in employment, either temporary or permanent, is urged to register with the Office on forms which will be supplied on request. At the September meeting of the APA a special



desk for the OPP was set up to furnish information and to allow for conversation with prospective clients. The general employment situation is reflected in the fact that from the numerous interviews there developed fourteen requests for help in obtaining psychologists and only four available applicants.

### INFORMATION SERVICES

The Office of Psychological Personnel continues to receive many requests for various types of information about psychology and psychologists. Many useful suggestions have also been received and acted upon or referred to appropriate officers or committees for action.

Several individuals and agencies have requested information about vocational opportunities in psychology. The Office has cooperated with the Information and Education Division, War Department, in preparing such information for distribution to soldiers through the U. S. Armed Forces Institute, and has worked with the National Roster of Scientific and Specialized Personnel in the formulation of publications for distribution to U. S. Employment Service offices, high schools, Veterans Administration offices, etc.

It is apparent that more complete and accurate information about careers in psychology is needed. The OPP is cooperating with the Subcommittee on Occupational Standards, Emergency Committee in Psychology, and with the APA Committee on Graduate and Professional Training in the collection and analysis of descriptions of the work and qualifications in the various specialized branches of psychology. The results of this study, combined with the statistical data of the OPP employment survey of January 1944, will form the basis for a pamphlet for the vocational guidance of those who are considering psychology as a life-work.

The following reports have been issued by the Office of Psychological Personnel during the year:

- Social psychologists in National War Agencies. *Psychol. Bull.*, 1944, 41, 115-126.
- Office of Psychological Personnel. Report for the Year 1943. *Psychol. Bull.*, 1944, 41, 246-252.
- The mobilization of psychologists for war service. *Psychol. Bull.*, 1944, 41, 469-473.
- By Robert R. Sears. Clinical psychology in the military services. *Psychol. Bull.*, 1944, 41, 502-509.
- Post-war reemployment prospects in psychology. *Psychol. Bull.*, 1944, 41, 653-663.

### STAFF OF THE OFFICE

The staff of the Office of Psychological Personnel during the year 1944 included the following persons:



*Director* (part time), Donald G. Marquis; *Assistant to the Director*, Jane D. Morgan; *Secretarial and clerical*, Ruth Aldridge, Paula Canter, Evelyn Lees, Rita Quigley, and Georgiana Stevens; *Consultants*, Robert M. Yerkes, Alice I. Bryan, Willard C. Olson, and Robert R. Sears.

## FINANCIAL STATEMENT—1944

*Receipts*

Balance on hand.....	\$ 300.00
American Psychological Association.....	10,000.00
American Association for Applied Psychology.....	1,000.00
	<hr/>
	\$11,300.00
	<hr/>

*Expenses*

Salaries (Director, Assistant, secretarial and clerical help).....	\$ 4,719.57
Office expense (postage, mimeographing, printing, telephone and telegraph, supplies).....	654.17
Travel.....	1,030.09
Reprints.....	212.68
Surveys.....	1,300.00
	<hr/>
Balance.....	\$ 7,916.51
	3,383.49
	<hr/>
Refund made to the American Psychological Association.....	\$ 3,075.90
Refund made to the American Association for Applied Psychology.....	307.59
	<hr/>



# SPECIAL TRAINING PROGRAM FOR COUNSELORS OF WAR VETERANS

JOHN GRAY PEATMAN  
*The City College of New York*

A special training program for psychologists and college personnel concerned with the vocational guidance and advisement of war veterans was conducted by The City College of New York in cooperation with the Veterans Administration for a four-week period during November and December, 1944. We shall briefly summarize the purpose of this special program, describe its content, and indicate some of the implications of the decentralized guidance program of the Veterans Administration.

## PURPOSE OF THE PROGRAM

The need for such special training programs arises out of the fact that many colleges and universities throughout the United States have been or are being encouraged by the Veterans Administration to play an integral role in the vocational rehabilitation of disabled veterans and in the reintegration of the non-disabled veteran to civilian life. This development was recently summarized by Mr. H. V. Stirling, Director of Vocational Rehabilitation and Education Service of the Veterans Administration, as follows:

In order that our disabled veterans may be brought into contact with the best qualified vocational counselors in the country a plan has been inaugurated . . . designed to effect close cooperation between our educational institutions and the Veterans Administration in providing further decentralization of vocational rehabilitation activities so that vocational counseling and induction into training may be accomplished more conveniently and efficiently at points near the homes of the disabled veterans (1).

Guidance centers have already been established in a considerable number of colleges and universities, and a total of two hundred or more is planned by the Veterans Administration in its implementation of Public Laws 16 and 346, passed by Congress to aid both the disabled and non-disabled veteran in his return to civilian affairs. Both of these laws call for a national program of veteran education and vocational training. Public Law 16, adopted in March, 1943, set up a vocational rehabilitation program for disabled veterans. Public Law 346, adopted in June 1944, and popularly known as the G.I. Bill of Rights, is for all qualified veterans. Under both of these laws, administered by General Frank T. Hines of the Veterans Administration, the Federal Government is charged with the responsibility not only of providing educational and vocational training to disabled and non-disabled veterans, but also has the responsibility of making vocational advisement available to each



veteran. Under Public Law 16 the disabled veteran is required to have the benefit of such advisement in order that, insofar as is possible, vocational handicap may be overcome; under Public Law 346, the veteran is entitled to guidance if he feels he may benefit by the advice of counselors with a wider background of training and experience than his own.

Millions of veterans, disabled and non-disabled, will be entitled to educational or vocational training over a period of from one to four years with tuition costs and subsistence allowances paid for by the Federal Government. Initially, they will be entitled to—they will need to have in a great number of the cases—the benefit of informed guidance. It is obvious that the success of this Guidance Program, set up on a widespread national scale that challenges the imagination, will depend upon the availability, in colleges and universities, of counselors who have not only the general psychological training requisite to vocational guidance, but who also will be informed of the details and many implications of the particular problems of this situation. The ultimate success of this vast program of vocational rehabilitation and education will depend to a large extent upon the character and competence of the guidance initially given by the counselor to the veteran prior to his actual entrance into a training program.

The program originally set up to provide the counseling services required by Public Law No. 16 was developed by the Vocational Rehabilitation and Education Service of the Veterans Administration in the Spring of 1943. This program was organized to include the procedures whereby guidance for disabled veterans was to be provided through the Rehabilitation Division of the regional offices of this agency. The personnel who carried on this advisement were, therefore, in the employ of the Veterans Administration, and the procedures prepared for use in interviewing, objective testing, supplying occupational information and making the final selection of the employment objective were developed by guidance specialists of the Vocational Rehabilitation and Educational Service of this federal agency. A series of standardized forms for collecting pertinent information and facts and for recording the evaluation of these facts were also prepared by them. A manual of Vocational Advisement to direct the procedures to be used in guidance was issued in January, 1944. This agency then brought to Washington for orientation training in the use of this Manual and the related forms two groups of psychologists and counselors selected to fill positions as Advisors in the regional offices of the various states.

As the man-power shortage increased and the advisement program was enlarged in scope by the passing of the so-called G.I. Bill of Rights in June 1944, the problem of obtaining highly trained personnel needed



for this work in the regional offices of the Veterans Administration became acute. This led to the plan of decentralizing the guidance program to colleges and universities. According to this plan such educational institutions as already had the required trained personnel for rendering counseling services of this nature were to be requested by Veterans Administration representatives in the regional offices of their state to submit an Offer Form for providing counseling services to veterans in case they were interested in aligning themselves with this program. Once these Offer Forms, stating in detail the facilities available for rendering such service, and the estimated per capita charge to the government for this service, were submitted by a college or university to the Veterans Administration, contracts between the two organizations could be effected. Such an arrangement offered the advantage that the colleges and universities were in a more favorable position than the Veterans Administration to avail themselves of properly qualified personnel. In addition the colleges and universities would be more closely accessible to the veteran, since the plans were designed to provide for several guidance centers in each state.

The first guidance center was established at The City College of New York in June, 1944, and has served as the pioneer advisement unit in the development of the college program. By September the counseling procedures of this first guidance center were well organized and functioning smoothly, but only after much had been learned. An advisement process that would be both systematic and at the same time yield a result vital and satisfying to each individual veteran had to be mastered. The psychologists in charge of the work were well-trained and long-experienced in college advisement and personnel services. However, they found themselves called upon to counsel and advise men and women whose education and job experience, whose interests and aptitudes, whose personalities and physical condition were as varied as our society produces. It promptly became necessary for them to become thoroughly cognizant of the details of the procedures as developed and required by the Veterans Administration, including a knowledge of the physical and psychological demands of all kinds of occupations, the character of the educational or training requirements of all kinds of jobs, and the probable post-war trends in work opportunities. A great deal had to be learned and it couldn't be accomplished in a day.

The purpose of the special four-week training program offered by City College was to share with psychologists of other colleges and universities the benefits of the experience obtained in its own advisement and guidance procedures as worked out in practice with the veterans and with the Veterans Administration. It was felt that such a program would help expedite the initiation of guidance centers in other universi-



ties, and that returning veterans in other parts of the country would therefore have competent counseling services under Public Laws 16 and 346 sooner than otherwise would be the case. Announcement of the program was made early in October, and on November 13, professors of psychology, directors of college personnel services, and college deans were on hand representing the Universities of Arkansas, Buffalo, Cincinnati, Dayton, DePauw, Georgia Tech., Howard, John Carroll, Miami, Missouri, North Carolina, Pittsburgh, South Carolina, William and Mary, and Youngstown, as well as St. Elizabeth's Hospital in Washington, D. C., the American Nurses Association, and neighboring colleges and universities in this area and in New England. All of the psychologists registered for the program had had considerable experience in vocational guidance or college personnel work. All were Ph.D.'s with the exception of two, who had their M.A. in Psychology and were completing the requirements for the Ph.D. In most cases the psychologists present were released by their institutions to attend the program in order that, on their return, they might immediately take over the operation of guidance centers being established at their institutions under contract with the Veterans Administration at Washington.

#### NATURE OF THE PROGRAM

The special program was organized as follows:

1. A series of lectures and discussions during the first week\* (2).
2. Seminars in occupational information for the advisement of veterans.
3. Seminars in psychological tests used in the advisement of veterans.
4. Seminars in the study of case records from The City College Guidance Center.
5. Clinical observation and participation in the actual procedures at The City College Guidance Center.
6. Round tables on Saturday mornings with all members of the group and City College and Veterans Administration personnel, for a discussion of the problems and questions arising out of the preceding week's work.†

\* These lectures were published as "Proceedings of the Special Training Program in the Advisement of Veterans," by the City College of New York (2).

† The personnel for the program consisted of the following: Dr. Daniel F. Brophy, Director of The City College Personnel Bureau and Director of The City College Guidance Center; Dr. Ira D. Scott, Chief of the Advisement and Guidance Division, Veterans Administration, Washington, D. C.; Drs. Louis Long, Kathryn Maxfield, LaVange Richardson and Frank Shuttleworth of The City College Personnel Bureau and Guidance Center; Drs. Marion R. Bartlett, Lorenz A. Meyers, James H. Russell, Carlos E. Ward, and Mr. Helmar S. Peterson, Veterans Administration, Washington, D. C.; and Dr. John Gray Peatman, Associate Dean and Associate Professor of Psychology of The City College, Director of the Special Program and Editor of the *Proceedings*. Dr. Gardner Murphy, Chairman of the Department of Psychology, The City College, and Lt. Hugh M. Bell of the Adjutant General's Department, Washington, D. C., also gave lectures during the first week of the program.



The lectures during the first week of the program served as an introduction to the basic principles and philosophy, as well as legal requirements, of the advisement procedures. The seminars and observation and participation in the clinical procedures at the guidance center were conducted concurrently during the latter three weeks of the program. The psychologists in attendance were subdivided into four groups in order that each member would have full opportunity to participate in all aspects of the program. The general character and principles of the guidance procedures were presented in considerable detail by Dr. Ira Scott who originally formulated the entire guidance program for the Veterans Administration, and particular emphasis was given to the determination of a veteran's need for training, as required under Public Law 16, and to the use of the Advisement Forms, 1902 series, employed in working out an appropriate occupational objective with the veteran. The kinds of counseling required were differentiated. Counselors need to be prepared to give personal adjustment guidance as well as vocational and educational guidance. The testing aspects of the procedures were presented in detail. A standardized battery is considered entirely out of place in this guidance program. Rather, psychological tests of various kinds for the measurement of abilities, aptitudes, discovery of interests and insights into personality are selected for use only as indicated—that is, only as relevant to the particular case. The seminar on reoccupations began with the use of the Dictionary of Occupations, required in the advisement procedure; the physical and psychological demands, the educational and training requirements, the employment possibilities of all kinds of occupations were studied. Towards the end of the program, each psychologist had the opportunity to engage in the actual advisement procedures at the guidance center, counseling one or more veterans.

#### SOME IMPLICATIONS OF THE VETERANS PROGRAM OF COLLEGE GUIDANCE CENTERS

One of the chief implications of the college guidance centers being established by the Veterans Administration is that they should enable the veteran to have a level or quality of guidance and advisement far superior to anything of this kind ever provided by any nation to its war veterans. The reorientation and integration of the returning servicemen to civilian life should therefore be more satisfactory than could possibly be the case without the availability of guidance provided by highly-trained psychologists in colleges and universities. The long-run social implications are self-evident.

A second major implication of this program lies in the fact that many colleges and universities that have not had adequate personnel services



will doubtless be able to maintain, after the Veterans Program has ended, such a center not only for their own institutions but for their communities as well. In this connection, it should be recognized that guidance services of the kind being developed for the returning servicemen are also needed throughout the nation for the civilian war worker, who, in many cases, will also have a real problem of reorientation and integration into our post-war society. Some community service centers have already been established with the problems of both the veteran and the civilian worker in mind.

Finally, the demand for highly-trained psychologists to staff the guidance centers to be established at colleges and universities by the Veterans Administration far exceeds the present available supply. Hundreds will be needed not only for these institutions but also for the regional offices of the Veterans Administration.\* The responsibility for meeting this demand for trained personnel is a challenge to many graduate schools of psychology. The training of men and women for this work obviously needs to be considerably more than academic. It requires not only adequate preparation in the use of tests for all levels of adult ability, but also an expansion of psychological programs to include courses in counseling techniques and in the study and use of occupational information, as well as interne experience in interviewing and advisement of adults.

#### BIBLIOGRAPHY

1. STIRLING, H. V. Education's part in the program of services for veterans. *Education for Victory*, 1944, 3, No. 12, Dec. 20, p. 9.
2. PEATMAN, J. G. (Ed.) *Proceedings of the special training program in the advisement of veterans*. New York: The City College of New York, 1944. Pp. 120.

\* It is to be observed that the staff of a College Guidance Center includes a vocational advisor and training officer in the employment of the Veterans Administration, as well as the members in the employ of the institution itself.



#### NOTE ON THE ARTICLE

#### "VETERANS ADMINISTRATION VOCATIONAL TRAINING PROGRAM: PROCESSING PROCEDURES USED BY THE COLLEGE OF THE CITY OF NEW YORK"\*

The Veterans Administration wishes to make brief comment upon the article by Drs. Brophy and Long, recently published in the *Bulletin*.<sup>\*</sup> Misunderstanding as to the nature of the counseling procedures formulated and applied by this government agency for administering its vocational guidance program might very possibly occur from the recurrent use of the term *screening* in the article. The following statements from the article illustrate this point:

The Veterans Administration has set up a screening process of which all disabled veterans making claims under Public Law 16 must avail themselves. . . . The screening and advisement process set up by the Veterans Administration was in the beginning operated by personnel of Veterans Administration itself. . . . If a veteran elects immediate screening, an appointment is made for him at the screening center.

The term *screening* literally means *to pass through a coarse sieve* and something of this connotation is retained in the modern idiomatic use of the term in industry and in the military and naval organizations. *Screening* as used by these organizations refers to processes used in the selection of personnel for certain types of jobs. Standards for the abilities or aptitudes required for a particular job are set up, and a technique, such as a brief battery of tests, is used to indicate whether or not men possess those abilities and aptitudes.

The Veterans Administration's counseling procedures are developed and applied from an entirely different standpoint. The view taken under this program is not that the object is to screen veterans to find those who will fit into one of a relatively few jobs. *All* veterans who come for guidance must be individually counseled in order to explore each veteran's abilities, aptitudes, and interests, with a view to finding which of all the vocational fields in the entire gamut of our social structure contains occupations suitable to his disability, abilities, etc., and to select one of these which seems most suitable to the veteran's needs, capacities and interests. Counseling and guidance techniques approach the problem from the viewpoint of the welfare of the individual person, whereas *screening* techniques are concerned with the job to be done. The two techniques are not always mutually exclusive, but differ widely in purpose, as *screening* has no place whatever in the techniques applicable to the counseling of veterans.

The article also stated that the Guidance Center at The College of the City of New York was to be operated as a *pilot* unit where "difficulties in the existing program could be discovered and worked out." While it is quite true that any program of this size has to be worked out empirically and perfected over a period of time, the fundamental groundwork had been laid by the Veterans Administration about a year prior to the making of a contract with The College of the City of New York for furnishing these services, and a very considerable number of veterans had already been counseled according to the procedures previously established. Forms for collecting the pertinent information and for logically evaluating it had been developed and a Manual of Vocational Advisement which explained the different phases of the work had been distributed to the Veterans Administration Regional Offices throughout the country. The manner in which the College of the City of New York did serve in a pioneer capacity was that of assisting in the working out of interrelationships between an educational institution and this government agency, rather than in *modifying procedures and correcting errors* as stated in the article.

\* BROPHY, D. F., & LONG, L. Veterans Administration Vocational Training Program: Processing Procedures Used by C. C. of N. Y.: *Psychol. Bull.*, 1944, 41, 795-802.



# THE DIFFERENTIAL VALIDITY AND DIFFICULTY OF SUBTESTS OF THE WECHSLER MENTAL ABILITY SCALE\*

WILLIAM D. ALTUS, 1ST LT., A.G.D.†

*Senior Personnel Consultant  
Ninth Service Command Special Training Center  
Camp McQuaide, California*

The objectives of an Army Special Training Center have been previously described by Bell and Altus (1). Briefly, the main function of this and other like centers is to bring the trainee, within a specified time, to a degree of literacy in reading, writing and arithmetic, which is roughly analogous to that of the fourth-grade level in the public schools. If the trainee fails to reach this level within the prescribed time limit and has no occupational specialty useful to the Army, he is discharged as inapt. Although the percentage of men thus discharged varies somewhat from month to month, in the main it is relatively constant at this Center.

The dichotomous disposition of most of the trainees (a few are discharged for reasons of physical disability) permits a statistical analysis of the validity of the various measures used by the Personnel Consultants in sectioning, counselling and prediction. Six of the tests administered to each trainee on his arrival at the Center are of the personal interview type; two are group tests.

The Wechsler Mental Ability Scale, Form B, is one of the personally administered tests. The total scale consists of seven verbal and nine performance subtests. In order to equate the contribution of each subtest in the final weighting, the raw scores of each test are converted into derived scores with equivalent mean and standard deviation. Owing to the number of trainees arriving weekly and the paucity of trained interviewers, only a limited portion of the total Army Wechsler Scale is administered. Through a gradual process, the following procedure was evolved: All trainees who understand English well enough to be tested in that language are subjected to the Information, Comprehension, Similarities and Arithmetic subtests of the verbal portion of the Wechsler; those who are non-English or nearly so are given the Digit Symbol, Series Completion, Mazes and Block Designs subtests of the performance scale. This number of subtests is not sufficient to allow full confidence in the index of brightness derived therefrom, but it has proved, along with the other measures employed, of worth in serving the purpose for which it was intended.

The intercorrelations among the eight subtests of the Army Wechsler

\* The opinions expressed in this article are those of the author and are not to be construed as reflecting the official attitude of the Army of the United States.

† 2d Lt. Ephraim Yohannan, 2d Lt. Jerry H. Clark and T/4 Edmund A. Ellis are to be credited with carrying out most of the statistical calculations in this article. Credit is also due T/4 Roy C. Burge and T/Sgt Clarence A. Mahler for aid in tabulating data.



administered at this Center are presented in Table I. The performance subtests generally have a considerably higher correlation with each other than they do with the verbal subtests; the correlations of the verbal subtests with each other are also lower than are the intercorrelations of the performance tests. The Digit Symbol and Series Completion have the highest intercorrelation among the performance tests with an  $r$  of .660; the highest comparable  $r$  among the verbal subtests is .462 between Similarities and Information.

TABLE I  
INTERCORRELATIONS AMONG THE EIGHT SUBTESTS OF THE WECHSLER MENTAL ABILITY SCALE, FORM B.

Subtest	1	2	3	4	5	6	7	8
1. Information		.214	.447	.462	.288	.332	.295*	.111
2. Arithmetic	.214		.383	.231	.383	.339	.026*	.314
3. Comprehension	.447	.383		.356	.191	.264	.346*	.189
4. Similarities	.462	.231	.356		.193	.348	.447*	.106
5. Digit Symbol	.288	.383	.191	.193		.660	.570	.593
6. Series Completion	.332	.339	.264	.348	.660		.446	.456
7. Mazes	.295*	.026*	.346*	.447*	.570	.446		.531
8. Block Designs	.111	.314	.189	.106	.593	.456	.531	

\* These  $r$ 's are based on an N of 52; all other  $r$ 's in the table have an N of 100.

One should be admonished that  $r$ 's in Table I do not represent the true interrelationship among these several subtests for at least two reasons. One is that the range of ability in an Army Special Training Center is especially narrow, almost all of it lying at the lower end of the distribution; this restriction causes the intercorrelations to be considerably attenuated. The other distorting factor is due to the fact that there are two groups represented in the matrix: the intercorrelations of the performance tests are derived from a non-English group; the correlations of the verbal subtests with each other and with the performance tests are derived from an English-speaking group. The interrelationship of the verbal and performance subtests for the non-English group was, of course, impossible to obtain.

All of the measures used by the Consultants' Section have been or are being validated against the criterion of graduation as opposed to discharge for inaptness. Admittedly, the criterion is only a partial one; it has, however, the merits of being definite and unbiassed, the promotion tests and the final examinations being of an objective type. Owing to the bifurcate nature of the criterion, bi-serial correlations and critical ratios have been the means employed to assess the relative validity of the Wechsler Scale and the other measures employed. The index of validity for each of the eight Wechsler subtests in use at this Center has been calculated. Since the calculations were performed with derived scores, it is possible to compare the subtests directly in terms of their difficulty.



## I. THE VERBAL SUBTESTS

TABLE II

VALIDITY AND RELIABILITY OF THE ARITHMETIC, INFORMATION, COMPREHENSION AND SIMILARITIES SUBTESTS.

<i>Measure</i>	<i>Arith- metic</i>	<i>Informa- tion</i>	<i>Compre- hension</i>	<i>Similari- ties</i>
$r_{bis}$ .....	.467	.406	.360	.334
P.E., $r_{bis}$ .....	.018	.018	.019	.020
Reliability, Test-Re-test*.....	.640	.806	.709	.670
P.E. of $r$ .....	.036	.021	.029	.034
Mean of Graduates.....	5.67	5.48	4.83	5.93
Mean of Discharges.....	3.98	4.12	3.36	4.76
Combined Means.....	5.31	5.19	4.48	5.68
Diff./S.E. Diff.....	14.70	13.33	10.89	10.73
(Means of Graduates and Discharges)				

\* Mean number of days between tests, 52.05. The N for the  $r$ 's concerning reliability is 121. The N's for the bi-serial correlations are very much larger.

In considering the validity coefficients in Table II, one must remember that the bi-serial  $r$ 's suffer an attenuating effect, partly because the subtests are short and hence not too reliable, but mainly because the type of men sent to a Special Training Center are quite homogeneous in verbal aptitude, *i.e.*, in the lowest seven per cent, in terms of scores, of those who take the Army General Classification Test. It is apparent, then, that these subtests possess relatively high validity, as validity is defined in this article.

It may seem somewhat puzzling that the Arithmetic subtest has a higher validity, both in terms of bi-serial correlation and of critical ratios, than any of the other subtests in spite of its having the lowest test-retest reliability. The probable reason for the relative superiority of the Arithmetic test is that one of the two group examinations for determining graduation is an arithmetic test partly devoted to simple number processes and partly to problem solving. From the standpoint of administration, the Arithmetic subtest is the easiest and requires the least time. Conversely, the Comprehension subtest is relatively difficult to administer and takes longer than any of the other verbal subtests; unfortunately, the bi-serial  $r$ 's do not indicate that validity is necessarily a function of difficulty of administration.

The ratios resulting from the division of the difference between the mean scores of those graduated and those discharged by the standard error of the difference are in perfect consonance, in terms of magnitude, with the bi-serial correlations in Table II. All of the critical ratios indicate statistically reliable differences, since they are well above the conventional three.

Table III presents data concerning the relative difficulty of the several verbal subtests for these soldiers of depressed verbal capacity



who are sent to a Special Training Center. It is permissible to compare the mean scores directly, as has been said before, because they are scores with the same mean and variability.

TABLE III  
CRITICAL RATIOS\* DERIVED FROM THE DIFFERENCES IN MEAN SCORES ON THE ARITHMETIC, INFORMATION, COMPREHENSION AND SIMILARITIES SUBTESTS.

Subtest	Comprehension	Information	Arithmetic	Similarities
Comprehension...	—	10.44	11.53	17.14
Information.....			1.85	7.90
Arithmetic.....				5.52
Mean Score.....	4.48	5.19	5.31	5.68

\* Diff./S.E. Diff.

All the ratios in Table III are statistically significant, excepting the one between Information and Arithmetic; even this ratio indicates that there are 97 chances out of 100 that the difference in mean score between these two variables is significant. The Comprehension subtest is the most difficult for the type of soldier assigned to this Center. It might be argued that the type of question found in the Comprehension subtest demands the greatest amount of abstraction, and for that reason is the most difficult. Inferentially, however, the information subtest requires the least in the way of abstracting ability and yet is more difficult than either Arithmetic or Similarities. Logically, the Comprehension and Similarities subtests are much alike in that both make demands on the ability to educe relationships; nevertheless, they are far apart in their difficulty value, the critical ratio of the difference of their means being 17.14. The author of this article has no reason he considers defensible for the differences in difficulty among the subtests. It can only be said that real differences do exist.

Data relative to the differences in degree of association of the verbal subtests with the criterion, graduation versus discharge, are presented in Table IV. The intercorrelation among the several test variables was taken into consideration in computing the significance of the differences among the  $r$ 's, in accordance with formula 108 of Peters and Van Voorhis (2). Only two of the critical ratios in Table IV reach the level of statistical significance, both of which include Arithmetic. There is, however, a reasonable degree of certainty (19 chances out of 20) that the Arithmetic subtest is more valid than the Information test for use in Centers such as this. There is also a fair probability that the Information test is more valid than either Comprehension or Similarities. Comprehension appears to be a better test than Similarities; at least there are about four chances in five that it would have a consistently higher degree of association value.



TABLE IV

RATIOS DERIVED FROM DIVIDING THE DIFFERENCE BETWEEN THE BI-SERIAL CORRELATIONS OF THE FOUR VERBAL SUBTESTS, BY THE PROBABLE ERROR OF THE DIFFERENCE.

<i>Subtests Compared</i>	$\frac{D}{P.E.D.}$	<i>Chances in 100 of a True Difference</i>
Arithmetic—Information.....	2.54	95
Arithmetic—Comprehension.....	4.86	100
Arithmetic—Similarities.....	5.54	100
Information—Comprehension.....	2.19	93
Information—Similarities.....	3.60	99
Comprehension—Similarities.....	1.13	78

## II. THE PERFORMANCE SUBTESTS

It has been mentioned that those trainees who are non-English or who know too little English to be tested on the verbal section are given the four performance subtests, Digit Symbol, Series Completion, Mazes and Block Designs. Table V presents data on these performance tests which are comparable except for reliability coefficients with those given in Table II for the four verbal subtests.

TABLE V

VALIDITY OF THE DIGIT SYMBOL, SERIES COMPLETION, MAZES AND BLOCK DESIGNS SUBTESTS.

<i>Measure</i>	<i>Digit Symbol</i>	<i>Series Comple- tion</i>	<i>Mazes</i>	<i>Block Designs</i>
$r_{bis}$ .....	.585	.464	.448	.379
P.E. of $r_{bis}$ .....	.033	.038	.038	.040
Mean of Graduates.....	6.32	7.22	9.07	7.54
Mean of Discharges.....	3.72	4.82	6.36	5.65
Combined Mean.....	4.38	5.44	7.05	6.14
Diff./S.E. Diff.....	9.49	7.16	7.77	6.38
(Means of Discharges and Graduates)				

The most noteworthy fact to be gleaned from Table V is the relatively striking validity of the Digit Symbol subtest in comparison with the others. The mean of those who graduated is 2.60 points higher in standard score than is the mean of those who were discharged. This figure is almost exactly synonymous with the sigma of the combined distribution of discharges and graduates, 2.62. The bi-serial correlation of .585 is higher by .118 than is the highest bi-serial (Table II) for the verbal tests. There are 98 chances out of 100 that this is a true difference; if the correction for the linear relationship between the two variables is applied, there are 99 chances out of 100.



The second most valid subtest is that of Series Completion. The Maze test is not far behind the Series Completion test in bi-serial relationship. Least valid of the four performance subtests is the Block Designs test.

Certain things about the non-English group should be pointed out before an attempt is made to rationalize the good showing of the Digit Symbol test. The non-English trainees are often literate in their native tongue, though they resemble the English-speaking trainees in not being literate in English as the Army defines literacy. The task of the non-English trainee is much harder than is that of the soldier who comes to the Center speaking English. The trainee of Mexican descent or nationality, the Navajo Indian, the Chinese—many of whom come to the Center almost devoid of English—must learn to read and write it to an approximate fourth-grade level and be able to understand the tongue well enough to carry out simple orders. That is a sizable requirement when one considers that only twelve weeks are allowed for the task.

The high validity of the Digit Symbol subtest may result from the fact that it is in miniature the learning of a new set of symbols somewhat analogous to learning a new language. The digits one to nine are presented on paper with, say, an *x* under one digit, an *O* under another, a straight line with a dot over it under another, and so on. After a brief demonstration, the subject writes the correct symbols under as many of the 93 digits which follow as he can in the two minutes' time allowed for the test. Inferentially, this type of activity is similar to learning a new combination of letters for a familiar object, as an American student of Spanish does when he learns to know *house* under the new symbol, *casa*.

The logical deduction of the preceding paragraph may, of course be factitious, for it is possible that the Digit Symbol test may be saturated with Spearman's *G* factor or with Thurstone's *V* or *W* factors. There are certain data in the third section which militate against such an interpretation, however.

Table VI presents the probabilities of true differences among the performance tests in their association with the criterion. It is probable that all of the critical ratios involving the Digit Symbol bi-serial are significant, even though two of them do not quite reach the mandatory four. It appears likely that the Block Designs subtest has a significantly

TABLE VI

RATIOS DERIVED FROM DIVIDING THE DIFFERENCES BETWEEN THE BI-SERIAL CORRELATIONS OF THE FOUR PERFORMANCE SUBTESTS BY THE PROBABLE ERROR OF THE DIFFERENCES.

Subtests Compared	$\frac{D}{P.E.D.}$	Chances in 100 of a True Difference
Digit Symbol—Series Completion.....	3.78	99
Digit Symbol—Mazes.....	3.81	99
Digit Symbol—Block Designs.....	5.57	100
Series Completion—Mazes.....	.38	61
Series Completion—Block Designs.....	1.93	91
Mazes—Block Designs.....	1.73	88



lower validity than any of the other tests since the differences in association value are consistent and all quite high. There seems little to choose between the Series Completion and the Mazes.

The critical ratios in Table VII are sufficiently high to assure statistical significance for all of the differences between the means of the performance subtests. It is of interest that the order of difficulty of the four subtests corresponds roughly with their order of validity. It is improbable, however, that difficulty, *per se*, has anything to do with the validity, for this relationship did not hold for the verbal subtests (Table II).

TABLE VII

CRITICAL RATIOS\* DERIVED FROM THE DIFFERENCES IN MEAN SCORES ON THE DIGIT SYMBOL, SERIES COMPLETION, MAZES AND BLOCK DESIGNS SUBTESTS.

Subtest	Digit Symbol	Series Completion	Block Designs	Mazes
Digit Symbol.....	—			
Series Completion.....		5.35	9.21	12.48
Block Designs.....			3.41	7.09
Mean Score.....	4.38	5.44	6.14	7.05

\* Difference in mean score divided by S.E. Diff.

There is a large difference in the mean scores of the Digit Symbol and the Block Designs subtests, 4.38 to 6.14. The critical ratio corresponding to this difference is 9.21. The difference could be ascribed, in part, to the fact that men unused to using a pencil, as is true of many of the trainees, are penalized on a paper and pencil test, such as the Digit Symbol, while they are not so penalized on the Block Designs test, where they only manipulate colored cubes. This argument loses its weight when the paper and pencil Maze test is considered, however; the mean score for this test is 7.05, making it even easier than the Block test.

### III. VERBAL AND PERFORMANCE TESTS COMPARED

It might logically be reasoned that the performance tests of the Wechsler are more valid than the verbal ones because their order of association with the criterion is on the average somewhat higher in this study. Since different groups were used in validating the two types of tests, one English-speaking and one non-English, and since the task faced by the separate groups is not the same although the criterion for graduation is constant, it is unwise to assume too much about the comparability of the two sets of validating bi-serial correlations. Fortunately, it is not necessary to rely solely on inference in regard to the relative validities of the two types of tests, although the subsequent findings are not so definite as could be wished.



When the Special Training Center was first organized in September, 1943, by consolidating the five separate units in the Ninth Service Command, more subtests of the Army Wechsler were given than was possible later when the receipts of trainees became greater. For the first two or three months, all English-speaking trainees were given the verbal subtests previously discussed and in addition two or more of the performance subtests were administered. Thus for the English-speaking group, it is possible to compare the relative validities of the two types of tests directly, although the number of cases involved is small in comparison with the studies reported in Section I and II.

It will be noticed that with the exception of one bi-serial correlation, all of the  $r$ 's of the verbal tests in Table VIII have the same order of magnitude as they had in Table II. Where Similarities was third in Table II, it is first in this table. Since there are over sixteen times the number of cases in Table II as in Table VIII, the  $r$ 's from the former table are, obviously, the more reliable.

TABLE VIII

VALIDITY COEFFICIENTS AND CRITICAL RATIOS OF FOUR WECHSLER VERBAL SUBTESTS AND TWO PERFORMANCE TESTS.

Measure	Similarities	Arithmetic	Information	Comprehension	Mazes	Block Designs
$r_{bis}$ .....	.528	.356	.277	.240	.137	.067
P.E. of $r_{bis}$ .....	.063	.072	.075	.076	.136*	.079
Mean of Graduates...	5.83	5.75	4.82	4.22	6.81	6.08
Mean of Discharges...	3.71	4.50	3.97	3.23	6.00	5.77
Combined Mean.....	5.35	5.46	4.63	3.99	6.63	6.01
Diff./S.E. Diff.....	4.82	2.84	2.50	1.98	.65	.57
(Means of Discharges and Graduates)						

\* The N for the Maze test is smaller than for the others, for which a constant number was used.

The two performance subtests, Mazes and Blocks, have a degree of association that is only one P.E. removed from pure chance. While it is true that the probable error is in part a function of the number of cases involved, the number of cases required to make these two bi-serial correlations significant would be enormous. More important than the statistical significance of the performance  $r$ 's is their magnitude in comparison with those in Table V for the non-English group: The Maze test drops from .448 to .137; the Blocks from .379 to .067. It appears that these tests have little validity for the English-speaking trainees while having considerable for the non-English soldier. If this finding can be shown to hold for the other performance tests, it will be of considerable interest and significance.



TABLE IX

THE RELIABILITY OF THE DIFFERENCES IN MEAN SCORES OF FOUR VERBAL AND TWO PERFORMANCE SUBTESTS.

Subtests	$\frac{D}{S.E.D.}$	Chances in 100 of a True Difference
Blocks—Information.....	5.02	100
Blocks—Arithmetic.....	1.91	97
Blocks—Comprehension.....	6.56	100
Blocks—Similarities.....	2.16	98
Blocks—Mazes.....	1.07	86
Mazes—Information.....	3.64	100
Mazes—Arithmetic.....	2.10	98
Mazes—Comprehension.....	4.66	100
Mazes—Similarities.....	2.26	99

Table IX shows that for the *English-speaking trainee* the two performance subtests are consistently, and in some instances significantly, easier than the verbal subtests. Tests can be equalized by the use of standard scores when the whole range of talent is measured; however, the equivalence of standard scores appears to break down when a large number of cases, falling in the lower extreme of the distribution, is tested.

TABLE X

VALIDITY COEFFICIENTS AND CRITICAL RATIOS OF FOUR WECHSLER VERBAL SUBTESTS AND TWO PERFORMANCE TESTS

Measure	Arith- metic	Compre- hension	Simi- larities	Infor- mation	Digit Symbol	Series Comple- tion
$r_{bis}$ .....	.754	.603	.505	.497	.281	.191
P.E. of $r_{bis}$ .....	.058	.082	.091	.092	.106	.109
Mean of Graduates....	5.23	4.17	5.25	5.11	4.79	5.40
Mean of Discharges...	2.00	1.63	3.31	3.25	3.82	4.56
Combined Mean.....	4.71	3.58	4.80	4.67	4.57	5.20
Diff./S.E. Diff.....	5.37	4.80	3.43	3.65	1.83	1.02
(Means of Graduates and Discharges)						

One may note in Table X that the validity coefficients of the verbal subtests are generally higher than they were in the previous tables. Excepting, however, the interchange of position of Comprehension and Information, their order of magnitude is the same as it was in Table II. The number of cases involved in Table X is less than four percent of the number in Table II; for that reason it is surprising that the validity of the subtests remains as constant as it does.



The Digit Symbol and Series Completion subtests show some validity and their order of association is somewhat higher than was true of the Mazes and Block Designs in Table VIII. The order of magnitude of the validity coefficients for the performance tests in Tables VIII and X is the same as it was for the non-English trainees in Table V. Where the coefficient for the Digit Symbol subtest was .585 (Table V, non-English trainees), in Table X it is .281; Series Completion drops from .464 to .191; Mazes, from .448 to .137; Block Designs from .379 to .067. This drop indicates that the performance tests, especially the Digit Symbol test, are neither tapping some generalized ability equally valid for all types of trainees nor some specialized factor such as Thurstone's V or W. By squaring the bi-serial  $r$ 's, one finds that the percentage of factors common to the Digit Symbol test and the criterion is approximately 34 for the non-English trainees; for the English-speaking group it is slightly less than eight. Similar drops will be noted for the other three performance tests. The validity of the performance subtests of the Wechsler is apparently governed by the degree to which the trainee in this Center is conversant with English.

The mean score of the Digit Symbol subtest shows this test (Table X) to be as difficult as the verbal ones. The Block and Maze tests appear, however, to be easier. While the mean score of the Digit Symbol is higher than the mean of the Comprehension test, it is lower than the means of the Information, Arithmetic and Similarities subtests. The mean standard score for the non-English trainees (Table V) on the Digit test is 4.38; for the English-speaking soldiers the score is 4.57, slightly higher but not significantly so.

The mean of the Series Completion subtest is higher than those of the other subtests in Table X. The only difference between the mean of the Series Completion and those of the other tests which is significant is with Comprehension, the critical ratio being 4.10. The non-English mean on the Series Completion (Table V) is 5.44, quite similar to the mean of 5.20 for the English-speaking trainees.

#### IV. DISCUSSION

The most striking finding of this study is the surprisingly high validity of the eight subtests of the Wechsler Mental Ability Scale, Form B, when validity is defined as association with the criterion of graduation versus discharge for trainees in an Army Special Training Center.

The correlations may not appear on the surface to be high in the usual sense but the attenuation introduced by the shortness of the subtests and the very restricted range of aptitude possessed by the trainees gives point to the fact that the bi-serials markedly understate the true validity of the tests.



The very good showing of the Arithmetic among the verbal subtests is somewhat spurious, owing, as has been mentioned before, to the overlapping of the test variable with one of the two tests used as a criterion for graduation. Its ease of administration and its power of discrimination mark this test as the most valuable verbal subtest in the Army Wechsler for use in a Special Training Center.

In the mimeographed directions for the Army Wechsler (3), the Similarities subtest is rated second in validity. This study has shown it, however, to be the least valid (Table II) of the four verbal subtests compared. On the other hand, the Information test, listed as fourth in value by the mimeographed set of directions, shows an order of association second only to the Arithmetic subtest.

The Block Designs subtest, rated first among the performance subtests in the directions for administration, comes out a poor fourth in this study (Table V). The Digit Symbol and Series Completion tests place first and second (Table V); the suggested order of validity in the directions was second and third, respectively.

The Digit Symbol test is significantly more difficult than any of the other three performance subtests for trainees in this Center. There is a high degree of certitude that it is more valid than any of the other performance tests. It is also the speediest of the tests from the standpoint of administration.

There was no evidence (Section III) for a high saturation of a generalized factor, such as Spearman's  $G$ , or of a restricted verbal factor, such as Thurstone's  $V$  or  $W$ , in the Digit Symbol subtest. Its high validity when used with non-English trainees is probably due to the similarity of learning new symbols for old and deeply ingrained associations, common to the test situation and the learning of a new language. Not mentioned in the preceding sections is the fact that the Symbol test had a higher order of validity for non-English trainees of Mexican ancestry or nationality than did a test of their literacy in their native tongue, Spanish. One wonders whether research would demonstrate a like degree of validity for the Symbol test in measuring aptitude for foreign languages among high school and college students. Certainly the secondary schools and colleges would furnish a wider range of aptitude, the narrowing of which attenuates the correlations in this study.

It is of marked interest that the performance tests in this study correlate well with the criterion when employed with non-English soldiers but that they lose their value, compared with verbal tests, when the subjects are English-speaking. Even the Symbol test had a low validity in comparison with the verbal subtests when applied to trainees who speak English; it did, however, remain the most valid of the performance tests.



There are marked differences in the difficulty value of the Wechsler subtests, despite the fact that they are couched in terms of standard scores. The order of difficulty for the trainees at this Center is, from most to least difficult of the verbal tests, Comprehension, Information, Arithmetic and Similarities; the order for the performance subtests is Digit Symbol, Series Completion, Block Designs and Mazes. One may infer that standard scores of equal value may be regarded as equal *only when the total range of ability measured by the test is represented in the mean scores of the groups compared*. Some unpredictable shifts in difficulty value may occur when the subjects tested are at the lower extreme of the distribution.

The data presented in this study are derived from only one of the Army Special Training Centers. In spite of this parochial limitation, it is believed that the number of cases involved, especially in Sections I and II, is of sufficient magnitude to assure that the results obtained have more than a modest degree of validity and reliability for Centers of this type.

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## BOOK REVIEWS

MARTIN, LILLIEN J. *A handbook for old age counsellors*. San Francisco: Gee Printing Co., 1944. Pp. v+84.

This posthumously published little volume, written in her 91st year, is a final statement by a remarkable woman regarding the work which made her famous.

After a foreword by Clare deGruchy there is a very brief historical introduction on "the development of social welfare work with old people." Part I deals with "methods for leading the old person to develop greater insight in his own problems." Part II deals with "re-education of the client for active participation in community and industrial life." Part III concludes with "the continued self training of the counselor." There are included such simple practical aids as a suggested chart of expenditures for old people of various incomes, a list of "slogans and poems used in the old age counseling center," and "mental setting up exercises" for rehabilitation. A tabular summary showing the re-employment brought about for certain old persons and resulting gain both to the individual and the community, and a brief bibliography, end the volume.

As the above topics indicate, the volume's purpose is very briefly to give methods and points of view developed by Dr. Martin in her work with old people. This it seems to do admirably. Pervasive throughout is the author's realistic appreciation of the problems of old age, her commonsense and practical point of view in approaching them, and above all her magnificent courage. There are sundry illustrative anecdotes; style is straightforward with occasional phrases of a touching eloquence. Emphasis throughout is on helping the older person toward self-understanding, self-help, and usefulness. The volume should be on the list of every person interested in problems of the older ages, and may become a little classic in its field.

Various features of the program may be questioned: the testing program; the emphasis on self-help to a point that family and community resources for aiding the elderly are neglected almost to the point of positive rejection, a hopefulness regarding vocational usefulness that seems beyond the facts of a peacetime economy. But these last are perhaps correctives of common misconceptions in the opposite direction, and are characteristic of the author's sturdy courage.

Ohio State University.

SIDNEY L. PRESSEY.

KLUCKHOHN, CLYDE. *Navaho witchcraft*. Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University. Vol. XXII, No. 2, 1944.

Any study by Kluckhohn in Southwestern Indian ethnology should be informative, thought-provoking, and scientifically competent. The reader of this monograph will not be disappointed. If the critic feels disposed to offer any adverse criticism, as he can in considering the interpretative sections of the work, the author disarms him by anticipating most of the objections. He does this by stating clearly the limited objectives of the investigation and the assumptions upon which his interpretations rest. Moreover, he expressly disclaims anything more than a tentative, hypothetical status for his conclusions.

The monograph is concerned with "Navaho idea and action patterns con-



cerned with the influencing of events by supernatural techniques that are socially disapproved." The author deals separately with four varieties of witchcraft, approximately named Witchery, Sorcery, Wizardry, and Frenzy Witchcraft. All are evil-working activities, but they are distinguished one from another by differences in technique. These categories, by the way, were not invented by the author, but by the Indians themselves. The methods, the victims, the practitioners, and the motives are all described, and they make fascinating reading. One misses an adequate comparative analysis of the data, especially with reference to other southwestern peoples, but the author has specifically avoided such a large undertaking. There is just enough historical treatment to whet the reader's appetite for more. This point is particularly important, for the author's psychological interpretations are based upon the postulate of adjustment and adaptation. If this postulate is sound, an adequate historical analysis should reveal some correlation between changes in witchcraft beliefs and historical changes in social patterns. The author recognizes this fact, and does mention a few instances of such correlation.

The basis for the entire interpretative discussion is that cultural forms persist only if, in some sense, they contribute to the survival of the society or its members. In addition, they must help the individual to adjust, i.e., to facilitate responses which remove the motivation stimulating him. The actual analysis is done principally in psychological and psychiatric terms, always in a setting of Navaho social and economic living conditions. This last point is a saving one, for it makes the interpretation less purely speculative than it might otherwise have been. There is, however, a great deal of speculation. It is plausible, and its persuasiveness is reinforced by frequent references to the physical and economic circumstances of Navaho society, conditions which might well lead to witchcraft relief as an instrument of social regulation and control. In this connection, it should be noted that it is belief in witchcraft that is fairly widespread among the Navaho, not the practice of witchcraft. It has proved extremely difficult to establish the existence of witchcraft practice, although the author believes that some of it does persist.

The interpretative section is rich in suggestions which are based upon an intimate knowledge of Navaho culture. Being witched is, for instance, an excellent way for persons of low social status to win attention to themselves, thereby reestablishing their egos. Witchcraft belief and practices may also permit the expression of antagonisms which could not be expressed in other ways. Many factors in Navaho life tend to produce tensions and hostility, and the witch is a scapegoat that fits the pattern of Navaho thought. Witchcraft belief, practices, and accusations may be related to the mechanisms of identification and projection, and serve to relieve anxiety. As an instrument of social control witchcraft accusations may be important. For instance, it is a threat held over the heads of agitators and other social disturbers. The rich are always in danger of being accused of obtaining their wealth by witchcraft. This may tend to reduce glaring economic inequalities.

All of these hypotheses, of course, remain unverified, reasonable though they may be. The whole discussion is functional in scheme. It is easy enough to think of alternative functional interpretations, and of others that are not functional at all. A postulate different from Kluckhohn's basic one of adjustment and adaptation might lead to a very different line of explanation and interpretation. This different line would also stand in need of verification. Consistency and congruity are not enough. Nevertheless, this monograph is a noteworthy essay in the analysis of ethnological and sociological data in psychological



terms, even though the interpretation is almost altogether speculative. Social psychologists will do well to read this paper.

University of Arizona.

MATTHEW M. R. SCHNECK.

SLADEN, FRANK J. (Ed.) *Psychiatry and the war. A survey of the significance of psychiatry and its relation to disturbances in human behavior to help provide for the present war effort and for post war needs.* Springfield, Ill. & Baltimore: Charles C Thomas, 1943. Pp. xxii+505.

As a result of a grant from the McGregor Fund of Detroit a conference on psychiatry was held at the University of Michigan over a period of three days in the fall of 1942. The present volume is a record of the proceedings of this conference.

Some thirty odd specialists participated by reading papers at the conference or by discussing them. The range of topics was wide and the viewpoints diverse. As might be expected, much of the material introduced was neither new nor directly relevant to the central theme of maximizing psychiatric contributions to the war effort. The individual papers are so varied in style and content that unified appraisal of the volume as a whole does not lend itself to succinct and adequate formulation. As edited the book reveals a division of the work of the conference into five parts each of which merits a few words of descriptive comment by way of delineating the organization of the book.

Part I is devoted to the *Philosophy of Psychiatry* and consists of six essays. In the first one Adolf Meyer discusses the meaning and scope of psychiatry. The other five have to do with psychiatry's "relationship to psychological schools of thought" and to its significance in the practice of internal medicine, general surgery, pediatrics, and geriatrics.

Another group of six essays supplies the material for Part II which is concerned with *problems of research in psychiatry*. Psychologists are apt to be particularly interested in this portion of the book so that a slightly more detailed account of it might be justified. The initial essay by Cyrus C. Sturgis is a very general but nevertheless decidedly stimulating discussion of some phases of medical research. This is followed by C. Macfie Campbell's account of the "controversial in psychiatry." In this context Campbell introduces some pertinent observations with respect to schizophrenia. For him the controversy regarding this psychosis "has some of the aimless quality of a battle royal or meleé. There is active discussion and criticism; but at the same time 'schizophrenia' remains merely a name, and one does not know to what the statements refer." He indicates that what is diagnosed as schizophrenia by the psychiatric staff of one institution might be differently diagnosed elsewhere. For example, in Burghölzli, famous because of its association with Bleuler, in the year 1940 of 578 first admissions 196 were placed in the schizophrenic category while only 2 were classified as manic-depressive. A ratio such as this is manifestly out of line with trends at other institutions. To read "reports of the results of various treatments," Campbell writes, "may seem interesting and may be accepted; but you are very anxious to know just what it is they have been treating. You have no idea." Because of this confused state of affairs he deems it impossible to evaluate the efficacy of the various techniques of shock treatment; since "it is extremely difficult to know what has actually been under treatment."

Campbell's paper is followed by Norman Cameron's discussion of the role of psychological research in psychiatry. He stresses a need for rapproche-



ment in saying, "I am convinced that psychology and psychiatry should never have parted company; they need each other badly." In addition, he points out the desirability of eliminating issues of hierarchical status in such cooperative research by suggesting that instead of regarding the psychologist as "merely the psychiatrist's *assistant*" the "two persons should be colleagues whose functions are regarded as of equal status" akin to those governing the professional teamwork of pathologists and surgeons. The need for teamwork is further suggested by Gildea's paper on the relevance of biochemical investigations for psychiatric progress. Incidentally, Cameron deplors the rise of *psychosomatic medicine*. For him it is "nothing but *mind-body medicine*" and "only new upholstery for a rickety piece of philosophical furniture; the old metaphysical structure is still there under new covering." However, about a dozen pages later one comes across a vigorous defense of "psychosomatic research in psychiatry" written by Franz Alexander. His justification for the retention of the concept Cameron spurns is indicated by the following passage:

Psychosomatic research deals with such processes in which certain links in the causal chain of events lend themselves, at the present state of our knowledge, more readily to a study by psychological methods than by physiological methods since the detailed investigation of emotions as brain processes is not far enough advanced. My expectation is, however, that even when the physiological basis of psychological phenomena will be better known we will not be able to dispense with their psychological study. It is hardly conceivable that the different moves of two chess players can ever be more clearly understood in biochemical or neuro-physiological than in psychological and logical terms (127).

By implication support for Alexander's position is supplied by Nolan D. C. Lewis in his paper on "the future in psychiatry." He contends that such subjects as neuro-physiology and biochemistry are not basic to psychiatry. They are ancillary; for psychiatry itself is a basic science. His viewpoint is summed up in this sentence:

It is a science of personal relationships, and while it is not a science of which every aspect can be subjected to laboratory experimentation to obtain the facts, we do have the facts of experience which are equally important and which we can handle in a scientific manner, substituting the experiment of the laboratory with the tool known as critical analysis (137-138).

As the foregoing excerpts indicate, the field of psychiatry is still plagued by conceptual and methodological problems whose metaphysical roots should be obvious to anyone familiar with the history of psychology. Parenthetically, it might be added that the entire volume reflects the divergent interpretations emerging from such roots.

To resume the task of sketching the volume's contents Part III must be considered. This is a potpourri of eight articles dealing with *psychiatry in the training, experience and education of the individual*. Although some of them are well executed summaries, the professional reader will discover little that is new to him as he peruses these articles. In less than 100 pages he is whisked through talks on psychiatry and education in general, on the part played by elementary schools, on the role of psychiatry in secondary schools and colleges, on similar roles in connection with courtship and marriage, in family life, in religion, in rural and urban community life and ending with William Healy's able discussion of the relationship of psychiatry to sociology and criminology.

Not until the middle of the book is reached does one come to grips with the subject of *psychiatry and the war*. The latter phrase is not only the title of the



book, but also the major caption for Part IV. Ten articles comprise this section. They include digests of the more or less well known ways in which psychiatric knowledge can enhance the efficiency of the army, the navy, the air force, and workers in civilian defense. There are also papers on national and international relationships, on postwar perspectives, on preventive psychiatry, on psychiatry in industry, and on morale and propaganda.

The fifth part of the book is made up of a review of the topics mentioned in the previous four parts with an account of the discussions of these topics by the numerous specialists who participated in the two symposia sponsored by the conference.

Considering the variegated nature of the material incorporated into these many articles the preparation of the index must have been a tremendous chore. The editor is to be congratulated for having executed this with exceptional diligence. Almost fifty pages are required for his splendidly detailed and usable index. This is all the more praiseworthy in view of the fact that volumes of this sort are so frequently published without any index at all. The care with which the volume was prepared for publication is also reflected in the relative paucity of typographical errors. The student of Greek might shudder to see *phylogenetic* spelled *philogenetic* (185). Descendants of Hans Gross, the criminologist, might also shudder to see their ancestor's name spelled *Huns Gross* (230). And no self-respecting group of psychiatrists would relish being called *phychiatrists* (288). Errors of this kind are hard to screen out in the first printing of a book and their occurrence is so rare in this volume that these few ought not to detract too markedly from one's appreciation of the competent craftsmanship shown by both editor and publisher in making these proceedings available to the public in attractive and readable form.

*University of Texas.*

D. B. KLEIN.



## NOTES AND NEWS

WILLIAM THOMAS ROOT, JR., dean of the Graduate School of the University of Pittsburgh, succumbed to a heart attack, January 24, at the age of sixty-two years. Dr. Root had served as an instructor in psychology at Stanford University (1913-18), and at the University of Pittsburgh as professor of psychology since 1920, as head of the department since 1929, and as dean of the Graduate School since 1935.

SIDNEY CLARENCE GARRISON, president, the George Peabody College for Teachers (Nashville), succumbed to a heart attack, January 18, at the age of fifty-seven years. He was professor of educational psychology and director of instruction in the Senior College and Graduate School of George Peabody College until 1937, when he became president.

LYDIARD H. HORTON, consulting psychologist, Boston, and lecturer on bio-psychology at the Boston University School of Medicine, died on January 19, at the age of sixty-five years.

CAROLINE BEAUMONT ZACHRY, since 1942 director, Bureau of Child Guidance, New York City Board of Education, died, February 22, at the age of fifty years. Dr. Zachry has served as an instructor (1922-23), Lincoln School, Teachers College, Columbia University; associate professor of psychology and head of the department of psychology and mental hygiene (1925-34), New Jersey Teachers College (Upper Montclair); director (1934-39), Research Commission on Secondary-School Curriculum and chairman of the study of adolescents, Progressive Education Association; and director (1943), Institute for the Study of Personality Development.

CLARENCE H. GRAHAM, professor of psychology at Brown University, has been appointed professor of psychology at Columbia University to take effect in September, 1945. He will be in charge of graduate work in experimental psychology.

At the Ohio University (Athens), J. R. GENTRY, GAIGE B. PAULSON, and T. C. SCOTT, have been promoted to professorships of psychology.

G. RICHARD WENDT, head of the department of psychology, Wesleyan University, will become professor of psychology and head of the department, University of Rochester (N. Y.), March 1, to succeed ELMER A. CULLER, who is resigning from the chairmanship because of ill health. Dr. Culler will, however, continue as professor of psychology and director of the hearing laboratory.

Since January 1, CHRISTIAN A. RUCKMICK has been assigned to the Operating Department of the Chicago and Northwestern Railway Company reporting directly to the vice-president of operations as supervisor of training. The scope of the training program covers the entire railroad and his services as psychologist are available to all departments of the company.

NORAH STEVENS, formerly psychologist with the YWCA, Toronto, was recently appointed to the staff of the Cottage School for Delinquent Girls, Sweetwater, Quebec.

LELAND H. STOTT, formerly assistant professor of home economics, University of Nebraska, has accepted a post at the Merrill Palmer School, Detroit.

BLANCHE CARRIER has been appointed instructor in psychology and sociology at the San Jose (Calif.) State College.

CHARLOTTE FEHLMAN has been appointed instructor in psychology, Adelphi College, Garden City, N. Y.

HUGBERT HAMILTON, associate professor of psychology at Temple University,



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sity, has received a grant from the Temple University Research Fund for testing the field and growth hypothesis that body temperature affects maze learning.

LT. JOHN W. M. ROTHNEY recently received the following Commendation for Outstanding Services conferred by Brigadier General J. W. Barnett, U.S.A.

First Lieutenant John W. M. Rothney, 0910881, AC, for outstanding service, 16 June 1944 to 21 December 1944. The splendid manner in which you inaugurated and expanded the educational program within this command exhibits outstanding leadership, ingenuity and sustained effort. The coordination between the services, the assistance rendered the American Red Cross, and the competent management of all instructors in your classes have enabled limited materials to bring maximum results. Your untiring efforts and unselfish devotion to duty is worthy of the highest commendation.

The Rorschach Test course at Michael Reese Hospital is scheduled this year for the week of June 4-8, inclusive. The records to be demonstrated will be representative of the older adolescent and younger adult; with especial emphasis on persons discharged from the military services. DR. S. J. BECK, head of the psychology laboratory, will conduct the course. It meets twice daily, two hours each session. Interested persons may inquire of the Secretary, Department of Neuropsychiatry, at the Hospital, 29th Street and Ellis Avenue, Chicago 16.

A Syllabus for courses in *Psychology and the Problems of the Post-War World* is being prepared by a Committee of the Society for the Psychological Study of Social Issues and will be ready for use in Fall classes. The syllabus material will be integrated with the new SPSSI Yearbook on *Human Nature and Enduring Peace* published by arrangement with Reynal and Hitchcock and Houghton Mifflin, and will contain other reference material as well. Questions and suggestions for the guidance of the Committee should be addressed to one of the following: HORACE B. ENGLISH, The Ohio State University, Columbus, Ohio; DANIEL KATZ, Brooklyn College, Brooklyn, N. Y.; EUGENE HARTLEY, 3772 Earlham Street, San Diego, Calif.; CLYDE HART, 2517 Mozart Place, N. W., Washington, D. C.; HELEN PEAK, Meridian Hill Hotel, 16th and Euclid, Washington, D. C.

*Correction.* In the January *Notes and News* section, an item which stated that W. M. DANNER had been added to the staff of Oberlin College, should have read that Dr. Danner had been added to the staff of the University of California at Los Angeles as lecturer in psychology.

*Plans for the APA Annual Meeting:* Because of the regulations of the Office of Defense Transportation, the Council of Directors of the American Psychological Association has voted to postpone for the present its plans for the Annual Meeting. The regulations allow small groups to get together for the transaction of essential business and set up no limitations as long as the number meeting is less than fifty. The Council of Directors and the Program Committee stand ready to plan some type of program on short notice when conditions permit. If the ban on conventions is still in effect as the time for the Annual Meeting in September approaches, the present Council of Directors probably will arrange for a small meeting of outgoing and incoming officers in order to have a good discussion of important problems and to permit a smooth transition to the new plan of organization. It is anticipated that some of the business can be transacted, if necessary, under the *convention by mail plan*. WILLARD C. OLSON, Secretary, American Psychological Association.



# Psychological Bulletin

## AGE DIFFERENCES IN PERSONALITY DURING ADULT YEARS

RAYMOND G. KUHLEN

*School of Education, Syracuse University<sup>1</sup>*

Psychologists interested in genetic development have been concerned primarily with the first third of the life span and have left relatively unexplored matters of development and change beyond the age of twenty. Quetelet's important two-volume work (88), published in 1835, probably marks the beginning of the scientific study of the life span.<sup>2</sup> In his efforts to throw light on development throughout life, Quetelet assembled a great variety of data,—ages when various types of crimes were committed, ages when various types of drama were written, ages of admissions to the hospitals for the insane, morbidity and mortality data, data on strength of grip. Despite this auspicious beginning over a century ago, interest has lagged until recently. In the last dozen years a number of volumes dealing with the adult years and with aging (9, 14, 57, 87) have appeared and several symposiums (58, 59) have been held. Efforts have been made also to summarize the research on certain aspects of development. Data on adult learning and intelligence have been reviewed several times (66, 92, 93, 122), and two general reviews, one by Miles (72) in 1935 and the other by Hofstätter (34) in 1938, have included studies of the type summarized here.

The present review is concerned with changes beyond the age of twenty in personality, in interests, attitudes, motives, aspirations. For the most part the review will be limited to studies reporting age differences, and will not include the literature on special adult problems such as unemployment or marital adjustment except in instances where age data are reported. The review may be considered reasonably complete up to the summer of 1944. Many reports including age data, however, do not reveal that fact in their titles and thus are extremely difficult to locate. A number of studies have been discovered through sheer chance, and others undoubtedly have been overlooked.

### INTERESTS AND AVERSIONS

Investigators have been especially active in studying adult interest patterns. Their efforts have been useful in giving an overview of personality change during adulthood and have provided significant data regarding values and motivations operating at different ages. Available studies relate to recreation, reading, movies, radio, hobbies, to "dislikes" as well as "likes."

*General Studies of Interests and Activities.* The most comprehensive studies of age differences in adult interests are reported by Strong (100, 103). His

<sup>1</sup> Now on leave of absence as Lieutenant (J.G.), H-V(S) USNR. In the preparation of this review the writer is indebted to Mr. David Bissett and (especially) to Miss Margaret Cairncross for bibliographical assistance.

<sup>2</sup> It is interesting that no reference to Quetelet's work appears in American bibliographies on the psychology of adult life. Hofstätter (34) in a German review called attention to Quetelet's efforts.



analysis (100) of 2340 Vocational Interest Blanks for professional men of 20 to 60 years of age resulted in the following conclusions: Older and younger men are equally catholic in their interests, though their likes and dislikes are not identical. Older men do not like activities involving physical skill and daring (walking on edge of precipice, being an aviator), nor does change or interference with established habits or customs appeal to them. In general, liking for linguistic activities declines with age, except reading which is liked better. Interest in most amusements declines with age except "cultural" activities (art, art galleries, museums), and older groups tend to prefer relative solitude. Things most liked at 25 tend to be liked better with increasing age, and dislikes similarly tend to become more pronounced.

Strong observed that about 50 per cent of the total change occurred between 25 and 35, about 20 per cent between 35 and 45, and about 30 per cent between 45 and 55. An interest-maturity score (a quantitative expression of the extent to which a given person's interests resembles those of 15- or 55-year-olds) showed similar trends, but little change appeared beyond 25 in later studies (103) involving a more representative sample of adults.<sup>3</sup> Further analysis in these later studies indicated that age trends for items did not in every case represent a straight line from 15 to 55. In fact, 40 per cent of the items showed trends whose direction was reversed at age 25, 40 per cent showed straight line trends from 15 to 55, and 20 per cent differed for different groups. In view of these various trends, two I-M scales were prepared, one based on 15-25 differences, the other on 25-55 differences. A correlation of  $-.41$  between these scales suggests that changes in interests beyond 25 reverse the trends prior to 25. Changes in interests appeared to be most rapid during the teens. Of the total change between 15 and 25, one-third occurred between 15.5 and 16.5 years, one-third between 16.5 and 18.5 years, and the other third between 18.5 and 25 years. Relatively little change on the 15-25 year scale occurred after 25, but on the 25-55 scale fairly uniform changes occur year by year from 25 to 55. Strong's general conclusion is that "interests change rapidly from those held at 15 years to those held at about 25, and then shift in the reverse direction much more slowly from about 25 years to 55 years." (103, p. 285).

Changes in types of interests apparent in the sample of representative adults (103) were substantially the same as those found in the group of professional men first studied. In his more recent volume, Strong (103) emphasizes similarity of interests among adult age groups; age differences are much less pronounced than occupational or sex differences. Interests of 15-year-olds correlated  $.73$  with those of 55-year-olds, and interests of 25 and 55-year-olds correlated  $.88$ . Strong concludes that "age and the experience that goes with age change an adult man's interests very little. At 25 years he is largely what he is going to be and even at 20 years of age he has acquired pretty much the interests he will have throughout life." (103, p. 313) The present writer, nonetheless, ventures the opinion that while the 25 and 55-year-old may be essentially alike in interests, those age differences that do exist, small as they appear in correlational data, are extremely important in understanding the older as compared with the younger man.

<sup>3</sup> In the recent summary of his interest studies (103) Strong reports age data for various groups: (a) the groups of professional men described previously, (b) a sample of 1000 men selected to be fairly representative of the population, (c) 80 pairs of fathers and sons averaging 58 and 22 years of age, (d) various groups of students re-tested after intervals of several years.



Thorndike (113) asked older professional and business people, all college graduates, to rate in retrospect the degree to which they were interested in 17 selected activities at each decade of their lives. Sports, outdoor games, dancing, reading fiction decreased in interest from the 20's to the 50's and reading newspapers and non-fiction gained. A median correlation coefficient of .63 (114) indicates the relative stability of these interests from 20 to 50. Interest in reading was least stable; playing a musical instrument was the most stable interest. The interest patterns of individuals were stable on the average to the extent of a correlation of .75—each correlation involving one person with 17 interests rated as of the two ages. Other inter-correlations (115), though low, show certain interests to go together and others to be antagonistic: High interest in one's regular job, for example, tended to be associated with low interest in recreation, especially sedentary games, dancing, theater and movies.

The results of interviewing one out of every 500 adults in Missouri with respect to their leisure time activities has been reported by Briggs (8). It was found that older people attended fewer movies and dances, participated less frequently in athletic events and sports, played cards less often and entertained friends less. Concert or lecture attendance and attendance at church did not seem greatly influenced by age, and the age of 25 to 50 seemed to be the lodge and club attending age with little change evident during this period. Two other general studies of interests have grown out of surveys made in an effort to determine the library needs of communities. Kelley (43) collected data in an eastern metropolitan area by means of a mailed questionnaire. The general trends described above again appeared: Interest in sports and active recreation tended to decline whereas interest in the more cultural pursuits such as reading and the arts tended to increase. Hall and Robinson (28) surveyed a rural western community of about a thousand people, by interviewing and testing 100 subjects carefully selected as representative of the population. Older groups showed greater interest in religion and politics, in newspaper reading, magazine reading and conversation. Interest in visiting and flower gardening increased with age whereas fishing and dancing lost in popularity. Quality of reading done and of movies attended seemed to increase with age. Other studies of special groups show essentially the same pattern of change described above. Allard (2) found the activity patterns of older and younger women elementary school teachers to differ in that older teachers read more non-fiction, rested more, retired early more frequently; they also swam less, danced less, played bridge less, took fewer professional and cultural courses. Adults attending Cleveland night school courses (135) showed similar trends in interests but selective factors probably lessen somewhat the value of this study. Sorokin and Berger (98) using a different approach to the study of interests, assembled time schedules from adults. Their cases were mostly in the 20's and thus do not provide much in the way of a life perspective. Younger adults appeared more social and active in their daily pursuits whereas older adults were more domestic and sedentary.

Not only are people more sedentary in their likes at older ages, but they participate in fewer activities. In a study made for the National Recreation Association (134) those between 46 and 60 years of age checked about 42 per cent fewer activities than those 21 to 26. With the exception of musical and educational activities, which increased with age, all types of activities decreased in frequency of participation. In general it was found that "desire" to participate was influenced by age in the same way as actual participation, but less mark-



edly.<sup>4</sup> Pace (78) found the older of two young adult groups (average age 27 and 31 years) to participate less in leisure pursuits. The extent of social participation (attending meetings, memberships, contributions) among rural folk was studied by Mangus and Cotton (67) and appeared to pass through an age cycle of inactivity, through wide participation, back to inactivity. Median participation scores increased from 4.9 for those 20 to 34 years of age, to 6.9 at 55 to 64, and back to 3.5 for those over 75.

*Hobbies.* The study of Missouri adults by Briggs (8) mentioned above has also provided data as to the relative frequency with which people of different age groups report having hobbies. Forty-six per cent of those 15 to 24 reported hobbies, with the percentage regularly increasing up to 95 per cent of the 65 to 74 group. A sharp decline in hobby participation beyond 74 occurred. In general those with more education reported more hobbies. Nestrick (75) reported somewhat different age trends, but his study involved "constructional activities" only,—preparing and cooking food, furniture making, painting, taking motion pictures. Men between the ages of 25 and 35 had more such hobbies than did men between 18 and 25 or between 45 and 55. Those who had participated in a hobby in childhood and youth tended to have more hobbies in adult years. Super has shown that different types of hobbies attract men of different ages (106, pp. 39–40), and that more older than younger men prefer their jobs to their hobbies (107). Landis (50) suggests that men's hobbies change more with increased age than do the hobbies of women, and believes that this "enforced" change contributes to the poorer adjustment of older men.

*Reading Interests.* Several studies have focused attention on the reading interests and habits of adults. Two unpublished theses summarized by Gray and Monroe (24) suggest the frequency with which adults turn to reading for recreation. Parson's thesis (79) revealed that the proportion reading books and magazines declined though the time so spent by those who did read remained about the same. In the case of newspapers, more people spent more time as age increased. The thesis by Farnsworth (20) reported slightly less book reading and more magazine and newspaper reading among older people. These results, and studies already mentioned (2, 28, 100, 113), suggest that age trends in reading are not striking, though if anything, reading—especially non-fiction—is liked better by older people.

Waples and Tyler (118) asked groups of adults to indicate what subjects they would like to read about. The reading interest patterns of two groups of telephone supervisors differing five years in average age correlated .91 while the interests patterns of women telephone operators differing twelve years in average age correlated .85. Older and younger high school teachers with an average age difference of seventeen years had interest patterns that correlated .81. Though progressive age differences appeared, they were by no means as striking as differences between sex and occupational groups, and between groups of differing amounts of schooling. Elsewhere Waples (117) has presented data indicating age differences in library withdrawals and in newsstand purchases.<sup>5</sup>

<sup>4</sup> These trends do not necessarily contradict Strong's findings of equally widespread interests among older and younger men. Strong's study involved "liking" whereas the survey just reported concerned "participation."

<sup>5</sup> Waples (117, pp. 214–215) states that some 500 manuscript pages of tables regarding community reading in Chicago and St. Louis are available for reference in the library of the Graduate Library School, University of Chicago. The data are broken down to show all meaningful relationships among 27 variables including age.



Circulation figures for magazines in 90 cities were reported by Lazarsfeld and Wyant (60) to correlate  $.39 \pm .06$  with the proportion of people in those cities over 45 years of age. This finding they thought due possibly to the oldsters having more time and money for recreation.

Several investigators (22, 38, 39, 89) have contrasted adult newspaper reading interests with those of adolescents (high school and college students). Johnson, for example, reported results for grades seven through eleven in one article (39) and for adults in a second article (38). When grades nine through eleven were contrasted with the adult groups it appeared that interest in comics, the sport page and puzzles had declined (though comics and sports were still interesting to adults) while interest in local news, news inside the paper, editorials, and advertisements increased. Front page news was near the top for all age groups. The sexes were similar with respect to these trends and in most other respects. Women, however, evidenced a much greater interest and one which increased with age in society news, advertisements, and the home page.

*Movie and Radio Interests.* Radio and movie interests of adults have not been so frequently investigated as have other interests. In general, however, both movie attendance (8, 100, 119) and radio listening (60) are less frequent among the older groups. Strong's study (100) suggests older men enjoy "cowboy" movies and movies dealing with travel and educational topics more, but like movies dealing with social problems less. More 50-year-olds preferred reading to going to the movies than did 20-year-olds. That adults tend to choose movies of a better quality than do school children has been shown by Hall and Robinson (28) and by Edman (18). According to Edman's study adults tend to be influenced more by advertisements in newspapers and outside the theater, or to attend without previous knowledge, while school children are influenced more by interest in the actors or source of production, or they follow recommendations of friends or magazine reviews. Most popular at all grade levels in Edman's study were comedy, farce, and romantic films. Among adults, however, comedy and farce dropped in popularity; romantic films, historical and social drama, and dramatized novels assumed places of importance.

Lazarsfeld (60) showed that in general people under 40 listen to the radio more than do those over 40. In the case of serious listening the relationship with age at first appeared inconclusive, but trends appeared when different cultural levels were compared. Older adults of high cultural background listened more to serious programs than did younger adults. Among the low cultural groups the trend was reversed. There was a definite tendency for older adults to show greater preference for radio over reading as leisure time activity. As a source of news, however, several studies summarized by Lazarsfeld (61) show older adults to exceed younger adults in preference for newspaper over radio. Habits developed before radio commentators were so prominent may account for this preference among older adults. A contrast of rankings of radio programs by those over and under 30, by Cantril and Allport (11), showed interest in sports and orchestra dance programs to rate higher among the younger men whereas the older men rated "old song favorites" and news events higher.<sup>6</sup> For women dance orchestras and jazz songs lost rank with increased age while old song favorites and opera gained. According to a study by Rubin-Rabson (90), though, older people appear to be more indifferent to both classical and modern music.

<sup>6</sup> This is not necessarily a contradiction to other studies here summarized. Among radio programs older men ranked newscasts higher than other offerings. At the same time they preferred newspapers to the radio as a source of news.



*Aversions.* Comment so far has been with respect to the everyday interests of people; further insight into interest patterns can be obtained from data indicating the things they dislike. Cason's study (12) of common annoyances represents the most important source of evidence, since detailed results are presented for age groupings from 10 to 90. Average scores indicated that annoyances tend to increase up to the middle age group (40-60) but to decrease for the old age group (60-90). As might be expected some annoyances tend to drop out while others are acquired, and on some items opposite trends characterize the two sexes. Items such as the following were checked as annoyances more frequently by the older groups: to see suggestive dancing at a social dance, to walk on ice-covered slippery sidewalks, to hear a person refer to a sex subject in a conversation, to see a woman smoking a cigarette in public, very noticeable powder on a woman's face, the odor of liquor on a person's breath. The following are typical of those checked less frequently by the older groups: a person with a gushing manner, to hear a person make bad grammatical errors, to have to get up in the morning, to hear a person scratch his fingernails on the blackboard, to see a woman wearing high heels, to see a person wearing clothes which are not appropriate for the occasion. In general borderline moral wrongs are more annoying to older people, yet at the same time they seem increasingly tolerant of many ordinary annoyances. Some of the trends seem to grow out of age differences in cultural backgrounds (e.g. seeing a woman smoke); others to be the result of changed values with age (e.g. appropriateness of dress); some to be due to increasing infirmities (e.g. slippery sidewalks) and others due to the fact that items were being judged in the light of experience which as age increases becomes less common or has receded farther into the background (e.g. scratching fingernails on blackboards<sup>7</sup>).

Some experiments by Thorndike (113) also relate to aversions. Certain experiments were set up to determine the relative ease with which young (21-25 years) adults and old (over 30 or 40) could learn things devoid of intrinsic interest, the relative reaction of adults to frustration and failure, their ability to overcome aversions by repetitions of the experience, their repugnance to change, and their general curiosity. In general these studies showed few differences between the age groups. But it should be pointed out that the groups involved were small (often only 10 representatives), that the age differences were relatively small, and that all subjects were habituated to experiments and questions of all sort. Greatest age differences appeared with respect to doing repugnant things such as eating beetles, worms, and human flesh, and desecrating things revered (e.g. spitting on picture of Washington or one's mother). At least the older groups said that they would require a more enticing offer of money to do these things than did the younger groups.

#### ATTITUDES AND OPINIONS

A number of investigators have studied changes in attitudes during the adult years. Studies dealing with political and social beliefs, with moral codes, with employment morale, and with tendencies to resist changes in beliefs or practices, all give insight into the adult mind.

*Political and Social Beliefs.* Sullivan (104) studied attitudes of women teachers toward social issues and found no trends with age. The lack of correlation between age and attitude is surprising since the older groups showed clear

<sup>7</sup> Decrease in ability to hear high frequencies may also be responsible for this particular trend.



superiority in information regarding social problems, and a correlation of .34 between information scores and liberality of attitude was obtained. Gundlach (25) failed to find a relationship between age and liberality of political opinion. Young (132) reported a study of a church congregation in which he found a slight but statistically unreliable tendency for older people to be less internationally minded. Harper (32) reports that educators over 45 years of age are not reliably different from those under 35 with respect to conservatism-liberalism. Pace (78) whose study has already been mentioned found no difference in liberality of attitude, in adjustment, or in morale, between two young adult groups averaging 27 and 31 years of age. Though this age difference was slight, reliable differences had occurred in leisure time participation for the same groups.

Several studies, on the other hand, have shown positive relationships between social or political views and age. Duffey (17) has shown parents to be reliably less pacifistic than their daughters and also to favor capital punishment more than do their daughters. Newcomb and Svehla (76) have found parents to be more conservative than their children and older parents to be more conservative than younger parents with respect to attitudes toward the church and toward Communism. The age differences in this latter study tended to be related to sex, men showing the greater age differences. Eldridge (19) suggests that up to about the sixties, adults show less and less "political intelligence." He tested some 1250 voters with a true-false test of public opinion to arrive at this conclusion. There was a steady decline in mean scores from the 20's to the 60's but the curve tended to rise again after 60. Eldridge offers as a possible explanation of the somewhat unexpected negative correlation between age and "political intelligence" the fact that the middle aged are more absorbed in domestic and vocational affairs and thus may be relatively insensitive to political issues.

*Employment Attitudes and Morale.*<sup>8</sup> Several studies deal with the attitudes of the employed and the unemployed, particularly with their morale. Watson (121) reports no relationship between morale and age over most of the age range, but men over 45 had slightly higher morale scores than the rest of the population. In interpreting these results he suggests that older men maintained their traditional faith in American opportunity for ability to bring advancement. Hall (27) analyzed the attitudes of employed and unemployed engineers. Of the unemployed men, those between 31 and 40 years of age showed the lowest occupational morale and also seemed most bitter toward employers. Unemployed men under 30 and those over 40 showed higher morale and greater friendliness toward employers. Tucker (116) analyzed the attitudes of 800 unemployed men and women (average age 30 years) who came to The Adjustment Service in New York City in 1933-34. The older men and women showed more favorable attitudes toward employer, toward religion, and toward the American form of government—but felt that employers discriminated unfairly against older workers. Personal optimism was correlated with age among women but not among men. A significant finding was that the length of time unemployed was practically unrelated to expressed attitudes.

*Moral Beliefs and Standards.* Several studies have been concerned with age differences in moral codes. Of the studies to be mentioned that by Anderson and Dvorak (3) is probably most revealing. A multiple-choice questionnaire in

<sup>8</sup> Studies dealing with "job-satisfaction" might very well be included here. Instead, however, they have been included later in a discussion of vocational motives.



which some right or wrong choice was required was given to 60 college men and women, to 48 mothers and fathers, and to 34 grandmothers and grandfathers. College students differed from their elders with respect to the basis of their moral judgments, preferring to make their decisions according to standards of intelligence or aesthetics rather than standards of "right and wrong." Parents ranked between grandparents and children in their emphasis upon absolute standards of right and wrong, aesthetic standards, and intelligence. Public opinion was the least frequent basis for choice at all ages. The greatest differences in standards of conduct appeared between age groups rather than between sex groups.

Acheson (1) studied the attitudes of some 50 women graduate students ranging in age from 23 to 52 with respect to such practices as women smoking, discussing sex questions with men, reading popular sex literature, drinking, petting, and free love. Self-estimates of behavior and attitudes during college and at present were obtained. Although the number of cases was too small for reliable conclusions, the older women tended to change least from their own college days to the present, while the group aged 30 to 34 changed most. The 25-29 year-old group changed relatively little but was originally most liberal.

Jones (41) has investigated the types of solutions that children and teachers of different ages think correct, excusable, or wrong when various moral problems are presented to them. That the children and the adults differed markedly in their judgments of right and wrong on certain issues suggests difficulties that the older generation has in understanding the behavior of the younger generation,—and the fact that adults differ as much as this study revealed suggests the conflicts posed for children trying to learn "right" from "wrong." In a second study Jones (42) asked teachers of different ages to indicate what they personally felt to be right, excusable or wrong, and also how in their opinion society at large would judge. Though there was considerable disagreement among teachers, they were in greater agreement when their personal ideals were compared than when comparison was made of their judgment as to what society expects! When the data were analyzed with respect to age, it appeared that older teachers considered more of the solutions either definitely right or wrong; they classified fewer proposed solutions as "excusable." A definite gap appeared between "self ideals" and "social standards" at all ages, but the gap was greater for those of older ages. The self-ideals of the younger groups were more in agreement with their ideas of society's standard.

A *Fortune* survey (133) indicated that older groups have more traditional ideas regarding right and wrong. Thus those over 40, more often than those under 40, tended to think that neither husband nor wife should have had sexual intercourse prior to marriage, and the older people tended to be less liberal in their attitudes toward the relaxing of the divorce laws. Cason's study (12), mentioned earlier, suggests older people to be less tolerant of borderland moral wrongs.

*Resistance to Change.* The suggestion is clear in the foregoing material on attitudes, as well as in the material on interests, that adults tend to maintain earlier established beliefs and to show some reluctance to adopt new ideas. Several studies have dealt more directly with this issue. Pollak (86) studied data from market and public opinion polls, analyzing responses to thirty questions dealing with the acceptance or rejection of new products, new forms of packaging and informing the consumer, changes in political, economic or social organizations, and changes in internal or foreign policy or government. Although those over 40 rejected change somewhat more frequently than did those



under 40, when the majority of the older rejected a change the young did also. Bean (4) studied the willingness of students and parents to accept change, finding that parents over 40 were less willing to accept the new than were those under 40. The *Fortune* poll (133) mentioned above showed older adults somewhat less willing than younger adults to break from political tradition on the third term issue. And Tucker (116), also mentioned earlier, found older adults to prefer the status quo.

Most studies, such as those just described, have not been designed to check on actual changes in the attitudes of the same people. How readily do attitudes of different age groups change? Two studies bear on this question. One investigation by Lorge (64, 65) involved two testings two weeks apart with a number of Thurstone's attitude scales. Twenty-five individuals between 20 and 25 years of age were matched on intelligence with 25 individuals over 40 years of age. The two sets of attitude scale results were then correlated, keeping the two age groups separate. With various types of analysis the older adults showed less tendency to alter their responses. Marple (69) studied the effect of group and expert opinion upon the expressed opinions of three age groups. Three hundred high school students (mean age 17.7 years), 300 college students (mean age 22.2 years), and 300 adults (mean age 39.1 years) were tested twice with an opinion scale, the second test following the first by one month. One-third of each group responded the second time with no intervening special influence; a second third responded the second time after being informed of the original judgment of the group; and the third 100 of each group responded the second time after having been informed of the opinion of a group of experts. Under these several conditions the high school students shifted more in attitude than did the college students who in turn shifted more than did the adults. All groups tended to shift more to agree with group opinion than with expert opinion, though the latter also caused considerable shift. These studies clearly indicate that when deliberate attempts are made to change opinions and attitudes, the older adults are less responsive. Their attitudes seem more rigid and crystallized.

Ruch (94) suggested that the conservatism of older people might be explained on the basis of the differential decline in learning ability that he has elsewhere (95) demonstrated. Older adults in general learn less effectively than do younger groups, but they are especially handicapped in learning material opposed to their already established habits.

### PERSONALITY AND ADJUSTMENT

Certain studies have been grouped together under the heading "personality and adjustment" either because "personality tests" were used in the investigations or because the scope of the studies was too broad to permit ready classification in other sections of the paper.

*Masculinity-Femininity.* Terman and Miles (112) have studied masculinity-femininity and related factors, using a specially designed "Attitude-Interest" scale which is differentially scored to yield a "masculinity-femininity" index. As age increased in the sample studied there was a consistent change toward femininity on the part of the males, and a lesser change in the same direction on the part of the females. The relationship between the M-F score and age was not the same throughout the life span, however. Before adolescence for men and before early maturity for women, age correlated positively with M-F scores, but after these ages the correlation was negative. As a group, men are never again as masculine after their thirties as they were in the eighth grade, high school or college. Strong's studies (102; 103, pp. 230-234) involving a



similar scoring of his interest blank show a similar tendency for both sexes to become more feminine as age increases, but Strong points out that sex differences are still marked in old age. The reversal in trend during the late teens or early twenties apparent in Terman's studies was not confirmed by Strong.

*Changes in Adjustment: Personality Test Results.* A number of studies relate to age differences in emotionality and neuroticism as measured by personality tests. Willoughby (126, 128) using a revision of the Thurstone Personality Schedule found wives to score as more emotional than spinsters and women to score as more emotional than men. Married and unmarried men differed little in test score. When the test results were analyzed with respect to age, early maturity and old age appeared to be the periods of greatest stress with a period of relative calm in between. There was a typical rise with age for introversion items (prefer quiet amusements, avoid crowds, prefer vacation in quiet place, prefer to spend odd moments reading). Willoughby is of the opinion that this does "not indicate any emotional disturbance, worry, anxiety, neuroticism, etc., but merely reflects something like a reorientation of interests with advancing age." This suggestion that the diagnostic significance of particular behavior (or test items) may vary with age is important. Most current personality tests are based on responses of people in their late teens or early twenties—a group that may be quite atypical compared to adults of more mature age. The wisdom, when such tests are used, of analyzing the data with reference to individual item responses as well as total test score is apparent.

In another article Willoughby (117) presents similar data on 504 unmarried women of superior social status and urban background. The curve of adjustment as related to age was very much like that described above, showing a rise from 15 up to the late 20's, a decline up to the climacteric, followed by a rise up to the early 60's. There was a slight decline or possibly stationary status in old age. Willoughby suggests that the first rise in the 20's may be associated with increasing tension from the life problems of sexual adjustment while the low level in middle life may reflect lessening of sexual tensions, relative remoteness of sexual possibilities, maximum earning power, and relative remoteness of incentives to old age.<sup>9</sup> The second rise up to the early 60's may reflect adjustment to old age.

Several studies have investigated age differences in neuroticism and emotionality among teachers. Phillips and Greene (83) using the Bernreuter Personality Inventory with 143 women teachers found an initial rise in neuroticism among single teachers with the peak at the age of 30; thereafter the curve declined. Among married women there was a steady decline with increased age suggesting improved adjustment. Teachers who pursued active outdoor and social hobbies were better adjusted than those who pursued work-type and teaching hobbies. Peck (82), using the Thurstone Personality Schedule, and Boynton (7) using an inventory devised by himself, also show older teachers to earn better adjustment scores than younger teachers.

Pintner and his associates (84, 85) have reported results of testing deaf adults with the Bernreuter. A slight but statistically unreliable relationship with age but none with length of time deaf appeared. Simpson (95a) found no relationship between score on the Thurstone Personality Schedule and age in the case of 252 adult prisoners. C. C. Miles (71) reported no relationship be-

<sup>9</sup> Elsewhere in a study of marital adjustment, Willoughby (125) reports a small and unreliable relationship between neuroticism and age. The younger women and the older men seemed to be the more neurotic.



tween Bernreuter scores and age in one paper, but elsewhere W. R. Miles (72) reported, apparently from the same study, no relationship *except* in the case of the dominance scale where an  $r$  of  $-.20 \pm .04$  with age appeared. Commenting in this connection on the results of an unpublished study of younger and older college professors, W. R. Miles (72, p. 639) suggests that "self-depreciation and inferiority attitudes are exhibited or experienced by the large majority of older people."

*Changes in Adjustment: Non-Test Evidence.* Those studies mentioned above which suggest better adjustment with increased age up to a certain point (say the late 30's or early 40's) receive support from the Gluecks (23) in their study of later criminal careers. In fact aging (maturation) appeared to be the most significant of 63 factors investigated in explaining the decrease in criminality occurring among ex-prisoners. A rising trend in improvement in all aspects of activities accompanied the passage of time. However, those people who had not gained stability by 36 seemed unlikely to do so in any fundamental sense thereafter. There were, of course, important differences in the rate with which different people "age." The tendency to "settle down" noted in interest patterns and in the Gluecks' study may lie behind the better adjustment scores reported in the articles just reviewed.

Information regarding the degree to which farmers were adjusted to their way of living was collected by Mangus and Cottam (67). They found no age differences with respect to total way of life, but more older than younger adults indicated satisfaction with their farms and farming, with their living conditions, and with their social-recreational life. The younger adults were better satisfied with their health and the health of their families.

Happiness is an aspect of good adjustment. It will therefore be interesting to see what ages appear happiest in retrospect. The following figures indicate the percentages of two groups, one of New York state old people the other of Iowa old folk, who thought the different periods of life were the happiest:

	New York (Morgan, 74)	Iowa (Landis, 52) <sup>10</sup>
Childhood (5-15 years)	14.5%	11.1%
Youth (15-25 years)	18.9	19.3
Young adulthood (25-45 years)	49.1	51.4
Middle age (45-60 years)	12.4	5.8
Later life (60 and up)	5.1	4.7
Undecided or No Data	....	7.7
No. of cases	370	450

It will be noted that the two studies are in rather close agreement, and both indicate that more old people find young adulthood to be happiest when looking back than any other age. However, two-thirds of the spinsters and bachelors in Landis's study (52), but only a third of the married people, said they were happiest in childhood and youth. This is perhaps suggestive of the emptiness of later years for single people since those who went on into marriage and parenthood numbered the young adult years as the most complete and happy. Watson (120) found no evidence for a relationship between happiness and age when he correlated present age with present happiness rating for several hundred graduate students ranging in age from 20 to over 60, and averaging 30 years. Un-

<sup>10</sup> Exact figures were provided by Dr. Landis in a personal communication.



doubtedly the question "How happy are you now?" results in an evaluation of a given age different from the judgment obtained when the same age is seen in retrospect with the question "What part of life do you think the happiest?"

Inasmuch as "nervous" people are unstable or to some extent maladjusted, data on age incidence of nervousness are pertinent here.<sup>11</sup> Some relevant facts have been provided by Hamilton (29) who reported the relative frequency with which individuals of different ages seek out physicians for "nervous" problems. Two hundred nervous cases in a community of 30,000 population represented the group tabulated. The 20's, 30's, 40's, and 50's were represented with almost the same frequency, whereas the first, second, seventh, eighth, and ninth decades of life had relatively few cases. In short, from the 20's to the 60's no great change in frequency of nervousness appeared.

*Personality Change in the Menopause.*<sup>12</sup> The period of the menopause has often been considered a period of increased nervousness, emotionality and stress. Yet it is striking that in data already cited (Hamilton, 29) nervous women were encountered in the 40's when the menopause typically occurs with no greater frequency than in the 50's when it seldom appears. The data of Willoughby (126, 127, 128), it will be recalled, show the fifth decade of life (the 40's) to represent the calmest period of the adult years, and none of the other studies of personality here reviewed has given any suggestion of increased disturbance during that period. This would seem to belie the generally accepted notion of marked emotional changes during the menopause. Typical, on the other hand, of clinical observations are the following symptoms which have been obtained from articles dealing with the climacteric and which may thus be assumed to represent the type of symptom in that clinical syndrome:

*Psychological Manifestations:* Malaise, lack of interest, depressive states, indecision, hyperirritability, feelings of self-pity, fear of decreasing feminine attractiveness, nervousness, morbid worry, suspicion of husband, family, friends, feeling of inferiority, changes in mood, decreased memory, lessened power of concentration, weeping spells, ideas of self-destruction, a tendency to be easily worried and upset by trifles, fault-finding, lack of plasticity, exaggerated sense of responsibility, apprehensiveness, inattention to dress.

*Physical Manifestations:* Dull constant oppression above and left of sternum, sense of uneasiness throughout chest, attacks of angina-like pain, breathlessness unrelated to effort, long sighing respirations, paresthesia of various parts of the body, palpitation (or sense of it) with no change in heart beat, vague lower abdominal distress, irregularity and discontinuance of menstrual flow, decrease in libido, varying degrees of impotence, prostatic involvement, unstable vasomotor reactions, lowered metabolic rate, nocturnal sweating, headaches, dizziness, nausea, increase in weight, easy tiring after ordinary exertion, constipation.

Werner (124) has indicated the frequency with which such symptoms appeared in 96 menopause cases. The average age of onset of these symptoms was

<sup>11</sup> Since this review is concerned with what might be called "normal" personality changes, studies of age trends in mental disease have not been included. Numerous studies such as those by Malzberg (68) and Landis and Farwell (48) have been reported and are important in assessing the total picture of aging. Let it suffice at this point to say that as age increases rate of admissions to mental hospitals also increases, and different diseases show different peak years of incidence.

<sup>12</sup> This section deals with women. The question of climacteric in men has not yet been sufficiently investigated to be included and even the existence of such a period is questioned by many. The climacteric among males probably occurs at an older age than in women, involves less pronounced symptoms and fewer individuals.



40.8 years. The underlying conditions appears to be a complex endocrine crisis involving an imbalance brought about by cessation of ovarian function, the rate of cessation being a partial determiner of the severity of the symptoms. Psychological factors are also undoubtedly important in determining the presence and the degree of menopausal stress.

In weighing the clinical evidence regarding personality changes during the climacteric it must be remembered that most of the cases studied *sought* medical attention and thus are not representative of the general population. But such evidence cannot be ignored even though not in line with more systematic personality test studies. The only conclusion warranted at present is that more research is needed; certainly dogmatic statements regarding stress at this age are inappropriate. It is even possible that the "storm and stress" of the menopause will turn out to be the same type of will-o'-the-wisp as the traditional, but never really demonstrated, "storm and stress" of adolescence.

*Factors Related to Good Adjustment.* From time to time in this review there has been speculation as to reasons for age changes in adjustment. At this point several sets of research findings will be summarized, some relating to age differences in adjustment, others to factors related to adjustment in old age but which nonetheless grow out of earlier developmental trends.

That the cultural milieu in which an individual matures will affect his later adjustment has been suggested in a study by Gundlach (25). Although emotional stability was not correlated to any marked degree with age in his study, interesting trends appeared when the data were plotted with reference to the social conditions present when the subjects of a particular age reached social maturity. Thus more neuroticism appeared among the group who had had almost all their maturity since depression time, but who were brought up in the habits and attitudes of the 1920's. Fewer high neurotic scores were found among those who were able to get established as adults before the depression came but who were too young to have had the military experience of the first world war. This type of analysis is highly suggestive as to the causal factors behind apparent changes in neuroticism with age, and represents a real advance over usual age studies.

Reasons why old folks designated particular phases of life as happiest may give some insight into factors making for good adjustment. Most of the old people in Landis's Iowa study (50) mentioned marriage and children as the reason for naming young adulthood as happiest. In fact those who never married more frequently named youth rather than young adulthood as the happiest period and mentioned parties and social activities as basis for their choice. When asked the causes of their happiness more than half of Morgan's subjects (74) named family and personal relationships; also mentioned were interest in work, health, religion, money, travel, and independence. When asked what they missed most from their younger days, they most frequently mentioned deceased members of family, health and physical activity, work, social activities, or "missed nothing." Among the factors that seemed associated with happiness in Watson's study (120) were (a) enjoyment and success in work, (b) success in dealing with people, and (c) an attitude of "serious, deliberate, earnest, hardworking living rather than impulsive, light, amusing, dilettante-ism."

Failure in love appeared to be the chief cause of unhappiness. When old age arrives, what factors tend to differentiate those who are well adjusted from those who seem poorly adjusted? The studies by Landis (49, 51, 52) and by Morgan (74) are again the basic source of evidence though Conkey (13) and Lawton (56) have also reported pertinent findings. Both Landis and



Morgan arrived at an adjustment score based on subjects' rating of enjoyment of life, the extent to which they had enough to do to occupy their time, whether they had hobbies, time for visiting and were relatively free from worries. Both studies indicated that the better adjusted people have plenty of work to do (and like it), are in better health, have more social contacts, have hobbies and recreations, and would like to live their lives over again. It should be noted, of course, that some of these items also contributed to the "adjustment score" and in those instances the reported relationships are spuriously high. Landis points out that old women are happier and better adjusted than old men, attributing this to the fact that two-thirds of the males do not have enough to do. Retirement from one's regular job forces upon the male a more definite change in life activities than is true of the female. Conkey (13) stresses three factors of great importance to good adjustment in old age: (a) strong or varied interests or activities, (b) economic independence or security, and (c) freedom from physical handicaps. Of these, interests are most important. Living in the past (e.g. reminiscing and keeping relics) seems to be a hindrance to good adjustment.

As might be expected good adjustment in old age is largely a product of good adjustment prior to old age. It is noteworthy that the better adjusted subjects in both Morgan's and Landis's studies more frequently wished to relive their lives, presumably because better adjusted people have a rosier picture to view in retrospect.

### MOTIVATIONS, ASPIRATIONS, LIFE PHILOSOPHY

One of the most important changes that occurs as people grow older involves their drives to action. What things do people of different ages hold important; what are some of the major age differences in value systems; what do people live by and for at different ages? In general, little is known about these questions. Material on interests and attitudes presented earlier in this paper give some insights. In this section some further findings will be summarized: data regarding personal problems, wishes, sex drives, vocational drives, religious feelings, and general life patterns.

*Personal Problems and Wishes.* The kinds of problems people of different ages face and the things they wish for should give some insight into changing goals and purposes. In an effort to discover the problems of people Symonds (108, 109, 110) asked high school students, college students, and adult graduate students to rank fifteen life areas in terms of the degree to which each was a problem or an interest. Trends for adults as a group have been briefly described in an abstract (108) and age trends from 12 to 50 based on several of Symonds' studies have been presented by Shuttleworth (96, Figs. 317-318). A striking increase in interest in philosophy of life from 12 to 50 occurred and interest in mental health and civic affairs also increased. There was a decreasing interest in social amenities, and an increase (a peak at about 21) followed by a decrease in interest in love, courtship and marriage. "Money" seemed outstanding as a problem but was ranked about the same by those between 20 and 50. The sampling of cases of course leaves much to be desired. Graduate students in their forties are very apt to be individuals who have had their life plans disrupted or who have never found themselves, and hence have greater problems in the areas of "personal values" and "ambitions."<sup>13</sup> But nonetheless, this study sug-

<sup>13</sup> Osburn and Murphy (77) used Symonds' procedure with 170 adult "non-college" students enrolled in evening school. Certain differences between these and Symonds'



gests certain important changes in life motives: first the waxing and waning of interest in sex; second, the need for money and concern with occupation and material things; and third, an increased concern with "spiritual" and philosophical values.

Wilson (129) compared the wishes of two groups of elderly people with the wishes of children and college students. It was apparent that cultural and socioeconomic backgrounds and chronological age affect people's wishes in early and late life. Among the most frequent wishes of the older group were general benefits for self (health, peace of mind, to live with family, etc.), money and wealth, companionship, activities, sports, diversions. In general the wishes of the old were more improbable of attainment compared to the wishes of college students.

A systematic analysis of wishes and personal problems based on a more representative sample of a wider age range should throw considerable light on adult motivation.

*Sex Drives and Physical Change.* Changes with age in sex drives suggested by Symonds' study are clearly demonstrated in studies of sexual activity at various ages. Terman (111) and Pearl (81) have shown frequency of coitus to drop steadily with increased age, and other studies (15, 16) indicate auto-erotic practices to become less frequent with advancing age. It is perhaps unnecessary to point out that sex life does not end with the reproductive life, both coitus and auto-erotic practices being reported in ages past the climacteric. Hamilton and MacGowan (30) have given some indication of the frequency of love affairs up to about 45. The peak ages were the late teens and the early twenties, with decreasing frequency to the forties. There was a suggestion of a second peak in the 40's, especially for women. Whether this is due to a woman's 40th birthday giving her "a more frantic sense than it gives the man that romance is passing with her youth" has yet to be checked by research,—as indeed has the whole question of the romantically dangerous 40's.

In connection with this last point (and possibly significant as a background for changes in other motives) is the fact that subjective signs of growing old are apt to involve physical symptoms twice as frequently as mental symptoms. According to Jones (40), who discussed some findings by Giese, the average age of becoming subjectively old is 49 years, but symptoms were first noted as young as 18 by one person and as old as 82 by another! Changes in motor ability, sex, circulation, metabolic activity, were among the physical symptoms. The more educated people reported a higher percentage of such mental signs as noticing that others thought them old, changes in intellectual interests, tendencies to reminisce.

*Vocational Drives and Satisfaction.*<sup>14</sup> Material aspects of life—money and vocational success—represent exceedingly strong motives in the American culture. It will be the purpose of this section to examine data on vocational restlessness and satisfaction, and on productivity that has depended upon personal drive and initiative, in an effort to note changes with age in vocational motives. The urge toward success and personal establishment in society for men ap-

findings were evident. "Philosophy of life," for example, was ranked about the same as a problem by both groups, but Symonds' college group appeared more interested in this life area.

<sup>14</sup> This section concerns men primarily. Most of the data relates to males, but Symonds (108) points out that his data indicate a greater "passivity and receptivity" on the part of women. In many aspects of age change it appears that different trends will characterize the two sexes.



peared in Symonds' data (108) to be strongest in late adolescence. The studies by Lehman and his associates (62, 63) suggest, however, that the drive for vocational accomplishment is strongest in the thirties and forties.<sup>15</sup> It is in those decades at least that outstanding people in various lines of work tend most frequently to patent inventions, to write books, to publish scientific articles, or to make new discoveries. And such productivity, it will be noted, is the sort that results largely from personal ambition and initiative and thus might most clearly reveal age differences in professional or vocational drive. Vocational drive does not reach a high level and then continue on at that plane; beyond a certain point a gradual abatement sets in. Thus Blum and Russ (6) found in a study of attitudes toward work incentives that the desire for vocational advancement is less important as age increases, compared for example with the desire for security, and Strong's Vocational Interest Test data (100) indicate a lessened desire for vocational advancement. In an analysis of the reasons why adults took home study course, Smith (97) found that those between 15 and 35 pursued work for specific vocational purposes, while those between 40 and 59 were beginning to take courses for non-vocational reasons, and those over 60 mentioned vocational reasons practically not at all.

Vocational restlessness as indicated by labor turnover figures might also give insight into age of vocational drive. Kitson (45) found the ages of greatest instability to occur in the early twenties and the early forties, with the ages of peak stability lying between 26 and 40. Kitson offers three possible explanations for increased instability in the forties: (a) ending of responsibilities for rearing children and paying for a home, (b) recognition of the fact that if a man is to change his job at all it must be before he becomes too old, (c) a general restlessness growing out of endocrine and other organic changes associated with the climacteric. Undoubtedly, too, much of this restlessness grows out of unsatisfied vocational motives, complicated no doubt by such factors as Kitson mentions. Wren's data (131) on vocational aspirations and status of adults of different ages are pertinent in this connection. Those of higher vocational status were older adults, but the aspirations of the entire group were high. Young adults have aspirations fully as high as those of older adults, but their actual status is less. Though increased age tends to close the gap between aspirations and status, it is not completely closed even for the older groups. For many the passage of time undoubtedly brings increased awareness that early aspirations will in all likelihood not be attained, resulting in increased vocational restlessness.

Despite a general rise in vocational status with age, many adults are dissatisfied. Paterson and Stone (80) found that 45 per cent of 700 adults would choose a different vocation if they could start again at 18. No clear cut relationship between age and job satisfaction is apparent in the several studies available. Super (105) found fluctuations from age to age with a general over-all tendency toward increased satisfaction. Hoppock (36) also found increased satisfaction among older workers, but Fryer (21a) and Kornhauser and Sharp (46) found no age trends. Hoppock (37), after reviewing other conflicting reports, concludes that the many inconsistencies in job-satisfaction data grow out of the fact that the factors are so varied that each situation must be viewed separately. The importance of vocational adjustment to the general adjustment of individuals and their families is sufficient to justify considerable further expenditure of research effort.

<sup>15</sup> No attempt is made in this paper to review studies of age differences in productivity.



*Spiritual and Cultural Values.* In later maturity concern over job and materialistic matters seems to lessen, and interest shifts to matters of philosophy, religion, and culture. Symonds (96), it will be recalled, found philosophy of life to be a greater interest at 50 than at 15; Tucker (116) and Hall and Robinson (28) found more favorable attitudes toward religion among older age groups; and Smith (97) found older people taking adult evening courses choosing courses of cultural rather than vocational value. Heidler and Lehman's study (33) of literary productions indicates that in the 50's and 60's philosophical, historical, biographical, and critical prose is most frequently written; the suggestion here is of an overall evaluation of life by older people. And G. S. Hall (26) believed that as people become older they become increasingly interested in the betterment of mankind.

Philosophical and religious concerns are of course extremely complex matters, and very few studies have attempted to analyze in detail the nature of the age changes involved. Kingsbury (44) reports the reasons people of different ages give for going to church. With increasing age the church appears less important as a place to hear music and literature, as a place to make friends, or as a help in formulating a philosophy of life. There was a marked increase with age in a desire "to keep alive the spirit of Christ" and increasing concern with assurance regarding immortality. The latter had been important in youth, but apparently lay dormant between 25 and 50, when people possibly were more concerned with the here-and-now and its attendant responsibilities. In a study published in 1900, Starbuck (99) also found evidence of an increased concern regarding immortality. There was an increase both in *belief in* and *rejection of* immortality with age, which was interpreted by Starbuck as indicating that immortality is a problem that thrusts itself to the fore and must be decided one way or the other. In this study belief in God and in religion as a life within increased with age, as did also the rejection of certain beliefs as unessential. Feelings of dependence, reverence, and oneness with God also showed age increases for both sexes, though more strikingly in the case of women. Various life motives were analyzed by Starbuck and grouped into "altruistic" and "self-perfection" motives; both types tended to become more important with increased age in the case of women, but tended to decrease among men. In explanation for the opposite trend for men, Starbuck suggests that males appreciated ideals more in their youth and hence tended to record them more readily then.

Meager as the findings here summarized are, they are sufficient to indicate that important changes occur with increased age in what might be termed "philosophy of life." This should prove a fascinating field for research.

*Life Patterns.* Certain trends in aspects of motivation have been presented. It is possible to discern a general pattern in the lives of people? Bühler (9, 10) has attempted to mark out some of the major trends that exist in total life patterns by analyzing approximately 300 biographies of people of various ages and professions. She reached the conclusion<sup>16</sup> that events, experiences, and attainments show a period of expansion, of stability, and of restriction, which parallel the biological curve though lagging somewhat behind. In individuals where

<sup>16</sup> Rubinow (91) published in English a synopsis of Bühler's monograph (written in German) in which were presented the supporting data for these conclusions. Feldman (21) has described what seems to him on an empirical basis to constitute the major phases of life and their characteristics. G. S. Hall (26) has written a volume recording his thoughts on growing old.



spiritual and mental factors predominate the high point is deferred to the end or latter part of life; and where life activities are dominated by physical factors (strength, beauty), the peak is reached earlier and the psychological curve more closely parallels the biological curve. Bühler notes several phases of the life span:

1. In early life (adolescence, young adulthood) activities have a preparatory or provisional character (non-specified activities);
2. at about 30 begins the period of "specification and definiteness in work" when life choices of mates and job have been made and energies are rather well directed;
3. at about 45 comes a period of testing results and accomplishments—whether one has attained the position, success, income for which he strove;
4. next is a period wherein striving for the desired success dominates the life picture.
5. Finally there is a period of looking back on life.

This general pattern fits in well enough with common observations, and might very well serve as a framework about which to organize much of the data contained in this review. The pattern was arrived at in a very subjective manner, however, and its greatest contribution lies in providing hypotheses to be tested in more objective fashion.

### GENERAL CONSIDERATIONS

The plan of this review thus far has been to summarize with little critical comment the available facts. Attention may now well be directed to some of the shortcomings of the data and to some of their implications.

In the main, this paper has been concerned with cross-sectional research, with age *differences* rather than with age *changes*. It is well to keep this fact in mind because representative samples of the population have seldom been obtained, and it is probable that those who make themselves available for study at different ages are selected on progressively different bases. Trends may appear which reflect the selective factors operating rather than reveal true age differences or changes. A differential selection may also tend to obscure personality changes related to a particular period, e.g. the menopause. This source of error has been overlooked by many investigators who interpret age differences much too literally, and indeed the error is difficult to avoid when discussing age data. Often in this paper reference has been made to age "changes" when, more accurately, "differences between age groups" is meant.

Assuming that representative samples of the various age groups have been obtained, a further common error lies in the assumption that age alone is the psychologically significant variable. It is often forgotten, for example that along with age go differences in cultural backgrounds and experience, and that age trends in psychological (or anthropometric) data must thus be analyzed in the light of cultural origins,—a point which the present writer has elaborated elsewhere (47). Since different age trends may occur in different sub-cultures, it is desirable that investigators carefully describe the group studied in reporting research. Certainly it is true that growing old is a much different experience in a culture where the old have prestige compared to aging in a culture where the old are deemed useless. It is probable too that as research accumulates different (perhaps even opposite) trends will be found to characterize the two sexes, developing as they do under differing cultural influences. There is always the danger of generalizing on too little evidence, especially when, as is the case in the psychology of adult life, studies are so few and so limited to particular cultural groups that conflicting facts often have not had opportunity to appear.



It is perhaps to be expected that the first explorers in an area of research will concern themselves with discovering the general trends, and leave to later workers the task of identifying the conditions that cause variations in those trends. Very little effort has thus far been directed toward discovering either the background conditions for adult personality change or the interrelations among various personality traits at the different adult ages.<sup>17</sup> The need for such studies is obvious. It would be desirable to know, for instance, whether the maintenance of active interests will result, as seems likely, in the maintenance of mental alertness and willingness to accept change. The following types of factors might fruitfully be studied with reference to their relationships to personality change: sex, cultural level, intelligence, occupation, economic status, glandular and other organic changes, various life demands (as, for example, occupational and financial pressures which seem sometimes to crowd out other concerns), marital status, presence of children. Some hints as to the influence of such factors on personality change are provided in studies reviewed here. It is to the credit of a number of investigators (notably Strong, 100, 103; Thorndike, 113; Willoughby, 128) that they have reported age differences for individual items, thus permitting at least an "inspectional" weighing of the relative contribution of various factors.

Long-time longitudinal studies will undoubtedly go a long way toward eliminating some of the difficulties just outlined, and should provide invaluable information not otherwise obtainable.<sup>18</sup> Such studies are, however, expensive and slow in yielding returns. While the foundations should be laid for later and improved cross-follow-up, there is an immediate need for data on adult years. Improved cross-sectional studies are probably most practical and should contain no serious weakness if adequate precautions are taken to obtain representative samples of various age groups, to obtain a variety of data on each subject, and to analyze the findings in detail. In this connection, it may be well to stress the desirability of using finer age groupings than have been used in studies to date. Grouping by ten years, or even larger intervals, is apt to obscure important differences and give only general trends that have limited value for understanding development. It is not unlikely that in certain phases of adult life changes are sufficiently rapid to make much finer age groupings (perhaps even by single years) desirable.

A final comment. Studies summarized in this paper might well be considered exploratory. They have sampled various procedures with different groups, and often have been more significant in the hypotheses suggested than in the findings themselves. A considerable amount of spadework has been done, and certain generalizations are already well based in research findings; yet, in general,

<sup>17</sup> Probably because of the difficulties in obtaining the cooperation of adults investigators have seldom obtained the necessary data from the same people to permit such analyses. In this connection the objections of one group of adults to taking the Bernreuter Personality Inventory, reported by Hampton (31), are of interest.

<sup>18</sup> Desirable as longitudinal studies are, they do entail certain serious problems. When a study is pursued over a 50 to 75 year period, it will be found extremely difficult to separate age change from cultural change (periodic cross-sectional checks will, however, be of assistance) and psychological tests will present serious difficulties. The latter relate sufficiently to the contemporary culture to be badly outdated, say 50 years from now. Where such tests are used it will be necessary to compare the same individuals at different ages with different or obsolete tests, a procedure little better than comparing different individuals with the same test as is done in cross-sectional studies.



eral, the data available are so meager that almost any systematic study can make a worthwhile contribution. It is hardly necessary to point out that the theoretical and practical implications of research in maturity and old age are sufficiently great to warrant considerable expenditures of time and effort. Much is to be learned regarding human motivation, for example, by viewing it against the background of lifespan changes in physical energy and in life demands, and any developmental phase (as adolescence) can be better understood when studied in the perspective of a broader age context. Psychology has contributed immeasurably to the effectiveness of elementary and secondary education by providing information (and emphasizing its significance) regarding the learner, his goals, his needs, interests, and personal traits. Psychology of adult life should make a similar contribution to adult education and should provide a background for realistic and effective programs of rehabilitation, postwar community planning, social security, adult counseling. In a society with increasing proportions of the population in the adult and older age brackets, such programs will become more and more important.

### SUMMARY

The data summarized in this paper are diverse and frequently inconsistent, though on certain issues the convergence of evidence is striking. The following points represent an attempt to cut through the inconsistencies in the interest of identifying some of the major age trends.

1. Interests change rapidly to about 25 years of age when a reversal in trend occurs; change is then slower and in the opposite direction. Late adolescence and the early twenties represent the age of vigorous physical activity and sex-social interests. Thereafter the trend is toward non-competitive, sedentary, relatively solitary activities.
2. Interest data also reveal a tendency on the part of adults to dislike activities involving the disruption of established habits or the undertaking of new and varied activities. This disinclination to learn may have greater implications for educators of adults than those growing out of evidence regarding changing ability to learn.
3. The relationship between active participation and good adjustment is apparent at any age. In studies of good adjustment in old age the maintenance of active interests and having sufficient work stand out as of first rank importance. The contribution that active interests make to the maintenance of mental youth needs investigating.
4. Old people tend to be more conservative and more traditional in their beliefs, but the age differences are not so striking as one might expect. Older people show a pronounced tendency to resist changing their beliefs.
5. Studies of neuroticism and emotionality suggest improved adjustment during the 30's and early 40's with a trend toward poorer adjustment thereafter. However, in view of the general shift in interest patterns one may well question the diagnostic values assigned personality test items on the basis of college student or young adult norms. The general re-orientation of interests may result in responses being "normal" which at an earlier age were symptomatic of emotionality or neuroticism. New tests for adults of different ages, or new standardizations of present tests are needed. It is also suggested that age studies employing personality tests should carry the analysis of trends to individual items as well as mean scores.
6. Data on job satisfaction are somewhat more inconsistent than other data,



but there appears to be a tendency for increased vocational restlessness and dissatisfaction to occur in the 40's. This represents an important area for further detailed research.

7. It has long been assumed that the period of menopause or climacteric represents a period of physiological and psychological disturbances. Quantitative studies bearing on the latter are quite consistent in revealing no undue emotional disturbance nor increased rate of personality change to occur. However, in view of clinical opinion to the contrary, more research is needed.

8. The available facts on the motivations of people at different ages are extremely few. Perhaps no area of the psychology of adult life is so in need of careful study. Among the major trends now apparent are (a) the waxing and waning of the sex drive and related social interests, (b) the strong vocational pressure in young adulthood and later last minute efforts to attain success, and (c) the later importance of philosophy of life and cultural values.

9. Individual differences among adults of any age are extremely great, and age differences in many instances are strikingly less than differences related to such factors as sex, occupation, education.

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# STRONG'S VOCATIONAL INTERESTS OF MEN AND WOMEN

A SPECIAL REVIEW\*

DONALD E. SUPER

*Captain, Air Corps*

In devising psychological tests our profession has been prolific: such instruments now number in the thousands. In validating them we have performed with less distinction, but there are now available a fairly large number of tests of proven value for various purposes. In the long term study and improvement of the tests we have devised, however, the record of our profession has not been so satisfactory.

Fortunately, there are a few brilliant exceptions to this last statement, exceptions which fully demonstrate the possibilities of psychological measurement. Most of this work has been performed by teams, and followed up, after its value has been demonstrated, by numbers of individual psychologists. Terman's work at Stanford with the Binet Test comes to mind as an example of a test carefully worked out over a period of time by a group of psychologists; it has resulted in innumerable studies by others, which have in turn resulted in better knowledge of the test, of its uses, and of the characteristic it measures. The work of Paterson and his associates and students at the University of Minnesota in the field of manual and mechanical aptitudes is another illustration. Thorndike's work at Columbia in group intelligence testing, and Thurstone's work at Chicago on the isolation and measurement of primary mental abilities, also stand out as examples of test experimentation carefully thought out and persistently followed through over a period of years.

The work now being reviewed is an outstanding addition to this list of distinguished applications of psychological methods to the measurement of human abilities and traits. It is perhaps a unique addition, in that it represents largely the interest and persistence of one man, and in that it deals with an aspect of the field of personality rather than with general or special aptitudes.

The value of such a contribution can perhaps best be demonstrated by a comparison of its outcomes with that of another. Three years ago the reviewer brought together the results of the then published studies of a widely used personality inventory. The original work on the inventory had been well conceived and carefully carried out. It had enjoyed, and still enjoys, a popularity which is, in contrast with that of most other measures of personality, fairly widespread and well-earned. Some one hundred and forty papers had been published in professional journals concerning it and its uses. But few of these had been prepared by the test's author, who, after his first studies with the inventory, had apparently cast it adrift on the seas of applied psychology. It had gone many places, but, pilotless, its final accomplishments were disappointing. This may be because the personality inventory technique is one with limited possibilities, but the widespread interest in further research along these lines suggests that systematic research might have led to further improvements. The many published studies duplicated each other unnecessarily at points, and left unexplored many newly discovered problems which should have been worked on. Improvements which might have been made in the inventory

\* Strong, E. K., Jr., *Vocational Interests of Men and Women*, Stanford University, Calif.: Stanford University Press, 1943. Pp. XXIX+746.



as a result of some of the investigations were not made, partly because the authors of the studies had no responsibility for the test, and perhaps also because the author of the test had no responsibility for the studies. The studies reflected the varied interests and opportunities of a large number of scattered psychologists. No one person or group of persons was concerned with the integration of the results of the investigations, nor with the planning and execution of other studies which might explore untouched problems or try out suggested refinements. As a result, the inventory in question is still of somewhat doubtful value in spite of years of study and pages of print. On the other hand, the work of Terman, Thorndike, Thurstone, and Strong has borne fruit in tests of known value and in greater knowledge of the abilities and traits with which they deal. This is to no small extent due to the continuing interest, persistent activity, and coordinating ability of the psychologists responsible for the original work.

In the *Vocational Interests of Men and Women* Strong has brought together the results of nearly twenty years of work with his *Vocational Interest Blank*. Although it deals largely and at length with his work on his test, the book also brings together the results of other studies using his interest inventory and of work with the inventories to which his is related. Other instruments for the inventorying of interests are considered when work with them throws additional light on problems which Strong considers pertinent, but not otherwise: for example, the *Kuder Preference Record* is barely mentioned, the *Cleeton Inventory* not at all. Despite recent important work with information tests of interest, interest tests, as contrasted with inventories, are dismissed in less than three pages in which the approaches of Burt, Flanagan, Super, and Wyman are briefly discussed, and the rather different approaches of R. B. Cattell and E. B. Greene are not mentioned. Even some studies with Strong's inventory are excluded, as in the case of the reviewer's investigation of the relationships of vocational and avocational interests, when they do not seem to contribute directly to the main currents of the book. As the volume reaches the monumental length of 746 pages in its present form this intentional cutting to the strictly relevant is understandable, even though a more comprehensive book, including Strong's thinking on the closely related topics which he has excluded would have been welcome. Carter's much briefer monograph, although it supplements Strong's and is a valuable brief review of research since 1931, is unfortunately also somewhat limited in its scope.

Recognizing that a great deal of the material in the book would be essential reading for all consulting psychologists and vocational counselors, and that much of the content would be of interest only to specialists in measurement, personality, and related problems, Strong has wisely devoted the first hundred pages to a review of the development, nature, and use of the test, and has reserved for the last six hundred pages the detailed discussion of matters covered more generally at first. Thus the clinician or consultant who uses the test in his regular work and who is interested only in understanding the inventory as a diagnostic or predictive instrument can, with occasional reference to later sections, quickly read the relevant part of the book: the style is clear and concise, the language not too technical, and the presentation suitable for those who have not specialized in measurement. The psychologist who wants detailed information concerning the technical problems encountered in developing the inventory, the methods used in solving them, and the results of its use finds the desired material in the well-organized body of the book.



*Contents.* Part I, general introduction, includes chapters on the nature of interest, guidance in terms of interests both estimated and inventoried, the differentiation and prediction of interests, the use of the *Vocational Interest Blank*, scoring the blank, and similarities in the interests of all types of persons. Part II goes into detail concerning Strong's well-known work on the differentiation and classification of interests. Part III contains chapters on the various types of interest factors, namely occupational level, masculinity-femininity, interest maturity, age (largely from his earlier *Change of Interest with Age*) and the results of factor analysis studies of Strong's scales. Part IV, guidance based on interests, deals at length with the permanence of interests, the prediction of vocational satisfaction, the interpretation of interest profiles, and the use of interest and aptitude tests in counseling. Part V consists of two chapters on the differentiation of the superior from the inferior members of occupational and academic groups, as contrasted with the differentiation of occupations as in the rest of the volume. Part VI is concerned with the differentiation of skilled workmen, and presents new and important material on the development and use of interest scales at the lower occupational levels; in fact, the reviewer read this material with the zest of one who is making an important new discovery, which indeed it is. Part VII goes into the details of the various scoring problems encountered during the course of work with the test, and the solutions proposed and tried. Two final chapters deal with miscellaneous problems of racial differences, heredity, faking interest, and the composition of criterion groups. The preview or summary in the first part of the book does not detract from the interest and value of the more detailed presentation which follows.

*Nature of Interests.* Although Strong has focused his attention on the development and study of his inventory, he has in that very process given much thought to and gathered much material on questions concerning the nature of interests. As is so often the case, a contribution to applied science has developed into a contribution to pure science.

Follow-up studies of college students by Strong and others have shown that interest scores are fairly stable during the college period and the years immediately following. Administration of the *Vocational Interest Inventory* to high school students demonstrated that the vocational interests of adolescents are similar in kind and not very different in degree from those of adults, and that interest scores are fairly stable during adolescence and early adulthood. Also, Carter's and Strong's comparison of the interests of monozygotic and dizygotic twins, of fathers and sons, revealed relationships comparable in their nature to those other studies have shown for intelligence, but lesser in degree: the correlation for monozygotics is .50, for dizygotics .28, for fathers and sons .29 (average of 22 scales).

These findings throw some light on the origin of interests and provide an answer to those who object to the use of a test standardized on adults in work with adolescents. That patterns of vocational interests begin to be clear cut in adolescence and remain fairly stable throughout life, indicates that the test can be used in vocational guidance at the high school level and that vocational interests are not acquired as the result of vocational experience. The interests of high school boys can and do resemble those of experienced engineers, printers, and accountants, even though they have never had direct and intimate contact with their work, and these resemblances are relatively stable. If these interests are therefore not the result of vocational experience, is it to be concluded that they are inherited? A case of this sort might be made on the basis of the above data, but Strong is too familiar with the results of other nature-nurture



studies and has studied his own test too carefully to reach such a simple conclusion. His answer is that interests are not inherited in the same manner as physical traits, but are learned, and that this learning is partly the result of inherited characteristics. Interest is the expression of reactions to the environment. The reaction of liking-disliking is the result of satisfactory or unsatisfactory dealing with that aspect of the environment. Strong believes, although he points out that evidence on the whole question is meager, that satisfactory dealing with objects depends upon abilities which are inherited. Interests might therefore be said to be the outcome of interaction between inherited abilities and the environment. That the relationship of ability and interest is obscure is, he suggests, the result of environmental differences: whereas an Indian boy with fine finger coordination might normally want to make arrows, and would be encouraged in his interest, an American boy might want to be a watch repairman or a dentist, and would be encouraged or discouraged in such ambitions according to the social status and mobility of his parents. In any case, Strong concludes, his data show that the contribution of environment to interest is made at an early date, in the home and in the elementary school. This has important possible implications for vocational orientation programs.

*Interest as a Predictor of Vocational Success.* Attempts have been made by various researchers to use measures of interest as predictors of success, satisfaction, and stability in an occupation. The correlations between abilities and success having been found to be far from perfect, it was generally assumed that interest and personality accounted for the rest of the variance. Tests of these factors were therefore seized upon eagerly to round out test batteries and regression equations for the prediction of vocational or academic success. When Fryer wrote his comprehensive review of interest research in 1931, the then published studies led him to conclude that interest and achievement were not related. Since that time, however, further work with improved instruments and methods has shown that a measure of interest is, to some extent and in some circumstances, a predictor of success or failure. In an occupation such as that of life insurance salesman, for example, the successful are rather well differentiated from the unsuccessful men, the correlation between volume of sales and Strong's life insurance salesman key being .37. This is a satisfactorily high relationship, for as Strong points out this is a coefficient based on only one test and on a restricted range of subjects. If more men making low scores on the scale (and selling less insurance) could have been included in the group the validity coefficient might be considerably higher. Despite the possibility of faking scores demonstrated by several experimenters, it has been shown that Strong's inventory can be of value in selecting life insurance salesmen.

But it is perhaps not simply a matter of chance that Strong's most effective work in the prediction of success with his inventory was with life insurance salesmen. In an occupation such as this, motivation to earn, and especially the congeniality of the means of earning, should be important. That this is so is indicated by some of Strong's exceptional cases, high-scoring salesmen who earned little but who had private sources of income, and low-scoring men who had exceptional contacts. In many other occupations interest factors should contribute less to achievement because they have less effect on the method of carrying on the work. Thus in the studies of the Minnesota Employment Stabilization Research Institute Strong's scales failed to differentiate between the employed and the unemployed in most occupational groups. It is rather surprising, but perhaps a function of the criterion or of the types of judgments to be made, that Strong found no differences in the teaching interest scores of



teachers rated successful and unsuccessful, whereas in the case of foremen in a chemical plant ratings of success yielded a correlation of .34 with scores on the chemists' scale. The data for aviators are suggestive however, even though the groups in question are small, for volunteers scored higher than others on the key, while successfully employed pilots were not differentiated from other volunteers who failed in training.

Data concerning measured interest and scholarship are similar to these last in their trend, in that correlations with grades are low while the relationship between continuation in a course of training and score on the appropriate interest scale tends to be high even when academic failures are excluded from consideration. Thus of dental students who scored A or B+ on the dentists' scale as freshmen, 96% graduated; of those who scored B or B-, 67% graduated; of those who scored C, 25% graduated. Similar results were found with home economics students, and, although Strong does not mention the study, with nurses by Williamson. Strong's general summary (529) of the relationship between interest scores and scholarship is typical of his judicious summaries of other problems:

All this suggests the following hypothesis: If a student has sufficient interest to elect a course, his grades will depend far more on his intelligence, industry, and previous preparation than on his interest. Interest affects the situation, however, in causing the student to elect what he is interested in and not to elect courses in which he is not interested. When a student discovers he has mistakenly elected a course in which he finds little interest, he will finish it about as well as other courses but he will not elect further courses of a similar nature. Because of this situation it is difficult to obtain a real measure of the relationship between interest and scholarship, since those with less than a fair amount of interest in the subject seldom take the course at all.

This reviewer would be inclined to call the above statement a conclusion rather than a hypothesis, in view of the evidence on hand. Further substantiation for it is found in a study of Strong's in a recent issue of this journal, in which Army Specialized Training Program students of psychology, many of whom had no special interest in their major, were the subjects. The nature of the group gave the investigator a less restricted range of interest test scores and a larger number of relatively uninterested students: in this case the correlations between interest test scores and grades in psychology were as high as those between intelligence test scores and the same criterion.

Strong has well pointed out, however, that achievement is not a suitable criterion of the validity of an interest test. He says (548):

Occupations are grouped as far as interests are concerned in terms of the kinds of things which are handled. . . . There is little justification for believing that men can be grouped on an interest basis with respect to the procedures employed regardless of the things handled. . . . Differences between superior and inferior men in any field would seemingly pertain to *how* they handle things, since they must handle much the same things. If so, it may actually be that the interests of superior and inferior men in the same field are much alike. On the other hand, the lack of success in differentiating the superior from the inferior may be the result of inadequate methods. This conclusion is justified at present because the more extensive investigations listed above have shown on the whole some differentiation.

The studies referred to in the quotation are investigations which used a rather more appropriate approach than those already cited in this review. Instead of attempting to predict success or failure with *occupational differentiation* keys, they developed keys based on the *differentiation of successes from fail-*



ures within a given occupation. Thus Ryan and Johnson found that superior salesmen and service men were not differentiated from inferior men in the same groups by valid occupational keys, but were identified by success-failure keys for each occupation. Strong points out that now that the importance of norming groups of more than 250 subjects is known, further work with success-failure keys should be tried.

*Interest as a Predictor of Vocational Satisfaction.* Recognizing that occupational interest inventories might not be predictors of success, many psychologists have continued to use them on the assumption that they were indices of probable vocational adjustment and satisfaction. Strong himself has subscribed to this hypothesis. On page 14 he writes: "Interests indicate satisfaction or to ability or to success as viewed by another . . . The desire for social approval is an important ingredient in satisfaction." He points out and illustrates the fact that social approval may result from things incidental to the activity rather than from the activity itself. Thus a girl may be interested in badminton, not because of ability in the game, but because of the opportunity to wear clothes which win social approval or in other ways to gain the attention of a young man who may like the activity for its own sake.

In spite of widespread acceptance of the hypothesis concerning the significance of vocational interests for personal and vocational adjustment, surprisingly little research has been done in the prediction of satisfaction. Strong himself has worked along somewhat different lines, as will be seen in the next section. Moreover, he has reported no studies of the relationship of interest to expressed or diagnosed satisfaction or dissatisfaction. In his chapter devoted to the prediction of future occupational satisfaction, the research material comes largely from studies using other approaches. Only one study using expressed satisfaction as a criterion is referred to, and, although stimulating quotations are taken from it, it is not discussed at length. The only other relevant studies known to the reviewer, his own, on avocational interests and vocational satisfaction, are not mentioned. On page 394, Strong quotes Sarbin and Anderson to the effect that "adults who complain of occupational dissatisfaction show, in general, measured interest patterns which are not congruent with their present or modal occupations." Findings such as these would seem to warrant discussion and further research.

*Interest as a Predictor of Occupational Stability.* Strong, the Dyers, and Van Dusen have emphasized another approach to the validation of interest inventories, and hence another interpretation of what they measure. Strong thinks of interest as a determiner of the *direction of effort*, while ability determines achievement (18). The direction of effort is, he believes, a resultant of both success and satisfaction. Concerned primarily with the practical aspects of his interest blank, Strong is apparently satisfied to rely upon a composite criterion of validity (387). Men do tend to enter and to remain in, for periods as long as ten years, the occupations in which they originally made the highest scores. Since, as Strong points out, irrelevant factors such as family interests tend also to make for occupational stability, this is not too satisfactory a criterion of adjustment. For this reason it is to be regretted that validation has not also been done by studies using approaches such as that of Sarbin and Anderson.

*Differentiation of Men and Women by Occupations.* The outstanding achievement of the author of the *Vocational Interest Blank*, and his best known to psychologists and educators, is his demonstration of the existence of measurable differences in the interests of men and women engaged in various oc-



cupations. The pioneer work in this area was started under W. V. Bingham's leadership by the outstanding group of applied psychologists who were associated with him at the Carnegie Institute of Technology immediately after the first World War. Strong continued with his work along these lines after that group broke up in 1923.

Persistence in this area involved, among other things, the working out of *weighting and scoring* formulas, activity in which he had the effective help of T. L. Kelley, and in which many amateurs and some experts are still engaged. Despite strong pressure for the development of a simple and time-saving scoring system, Strong has consistently held out for the most valid possible technique. His approach, as illustrated by various journal articles and by chapters 23 and 24 of his book, has been marked both by a willingness to test the value of various suggested simplifications and by an insistence that, before a modification such as Dunlap's is adopted for use, the experiment provide an affirmative answer to the question, "Does the simplified method distinguish between occupational groups as well as the more complex?" If the answer was negative, Strong rejected the simplification. This attitude has resulted in a great interest on the part of test users in more easily scored inventories such as Kuder's, and even in a market for some tests of spurious face validity, but the wealth of data concerning Strong's blank, his insistence on high standards of efficiency, and the increasing availability of machine scoring should assure him a substantial group of discriminating users.

Another problem to which Strong had to find an answer was that of the *number of cases* needed for the standardization and validation of a scoring key. Earlier studies, including that made by Cowdery under Strong's supervision and which encouraged the latter to continue his work at Stanford, had suggested that groups of as few as 100 men should be sufficient for the normative group (638). As his work progressed, however, he found that increasing the size of the norming group increased the validity of the inventory, and that, when groups as of many as 400 to 500 men were used, cross-validation was not necessary. When getting cases is difficult, it is better, according to his data, to put them all in the norming group than to save some for a check on the validity of the key. The need for large norming groups has recently been amply confirmed for a variety of tests by the work of army aviation psychologists, in which numbers comparable to Strong's have been found adequate, but cross-validation has been found to be desirable in order to insure a refined and stable scoring key.

The *point of reference*, or men-in-general group to which to compare men in an occupation for which a key is being constructed, provided another real and fruitful problem which Strong had to solve in the development of his inventory. Early studies, in which men in two or more occupations were lumped together into a men-in-general group for contrast with the group under investigation, used whatever subjects were available as a point of reference. This procedure worked very well, until enough occupations had been studied for three problems to be encountered, arising from the point of reference. The first of these arose when attempts were made to measure the interests of men in the skilled trades, the second when interest inventory technique was applied to women, and the third when the interests of men in closely related occupations were being measured.

Work done at the Minnesota Employment Stabilization Research Institute, where the first extensive use of the *Vocational Interest Inventory* with men in the skilled and semi-skilled trades took place, had suggested that men in some



of the skilled trades have interests which resemble in kind but differ in degree from those of men in certain higher-level occupations, and that the interests of the rank and file of workers are undifferentiated. Demonstrating in this, as in connection with many other problems, a laudable degree of scientific imagination and thoroughness, Strong set up three hypotheses, namely that:

1. Certain occupations at different levels have the same type of interests.
2. The rank and file cannot be differentiated by their interests.
3. Men in the lower-level occupations have their own peculiar interests.

He then proceeded to experiment with occupational scoring keys in which the likes and dislikes of men in both higher and lower-level occupations were compared with those of men in the higher-level occupations, in the lower-level occupations, and in a cross-section of occupational levels.

The standard keys for Strong's inventory are based on a high-level point of reference, consisting largely of men in business and professional occupations. Using a low-level point of reference, Strong found that the intercorrelations of high-level occupations were raised, but those of middle-level occupations remained the same, and that those of low-level occupations were lowered. The effect of this last finding was to break up Group IV, consisting of low-level technical occupations, into several occupational groups. Although Strong's current occupational classification would be essentially the same so far as it goes, with either point of reference, this makes it clear that as scoring keys are developed for additional lower-level occupations, using the lower point of reference, new occupational groups will be added to Strong's steadily expanding list.

Strong points out that the earlier studies which suggest the validity of hypotheses 1 and 2 were in error, because their authors viewed lower-level occupations from above. This fact can be demonstrated in reverse, by viewing higher-level occupations from below: when compared with other business and professional men the interests of lawyers and accountants, for example, correlate  $-.42$ , but when the skilled-trade group is used as a point of reference for their scoring keys, they have a correlation of  $.61$ . In other words, when men engaged in differing occupations at the same social level are compared by means of men of their economic class, their interests appear to be quite different; but when they are compared by means of men of lower social levels they seem quite similar. Strong's third hypothesis therefore seems to be validated, and there is reason to think that in due course interest scales should be available for use with the skilled trades and perhaps the semi-skilled occupations. When this is the case, examinees should be scored, Strong concludes, on the high-level scales if their occupational level score is 45 or above and on the low-level scales if their occupational level score is below 45.

The Minnesota psychologists turned up another problem for Strong (upon which one of his students at Stanford and Manson at Northwestern had already done some work) when they found that the *interests of women* were more nearly universal than were those of men. As Crissy and Daniel put it (to their subsequent regret, when letters of protest began to arrive from women psychologists) the interests of most women seem to be heavily loaded with a factor of "interest in male association." As Strong points out (166), the naming of the factor is open to question; the important point here is that this factor is very common in women, making it difficult to construct interest scales for women's occupations. As jobs are really only stop-gaps before marriage for many women, Strong says, it is difficult to obtain homogeneous groups of employed women



upon whom to standardize and validate keys. In the case of men, whose lives are more job-centered, this is much easier. Despite these obstacles, Strong has succeeded in developing satisfactory scales for professional women. He points out that the task of developing keys for guidance in connection with the occupations entered by most women still remains to be done, and the method has not as yet been developed as it has been for the lower-level men's occupations. A scoring key which would differentiate career women (if indeed there really are such) from women who marry in due course would, if properly used, be a valuable tool in educational and vocational guidance and selection; but the difficulty of the task is suggested by the high correlations of the keys for such popular occupations as nurse, elementary school teacher, office worker, and stenographer with that for housewife.

In the case of men, the point of reference created a problem of measurement at different social levels of which Strong became fully aware and for which he found a solution. In the case of women, the point of reference created a problem because too many women appear to have the interests of women-in-general. Strong recognized it, but has not yet found a complete solution to it. The point of reference has created a third problem, of which Strong does not seem to be fully aware and concerning which he has taken no action. This problem has to do with the differentiation of interests in men in closely *related occupations*.

Estes and Horn, for example, made a study of engineering students in which they found that the interests of civil, chemical, and industrial engineers were not at all like those of Strong's criterion group. Even the correlations of their mechanical and electrical engineering scales with Strong's key (which was based on those types of engineers) were only in the neighborhood of .70. As Strong points out (121), we now know that this is to be expected, for Estes' and Horn's point of reference was an engineering group, whereas Strong's was a group of men-in-general. When the interests of mechanical engineers are contrasted for keying purposes with those of engineers in general, they appear to be an interest group distinct from other engineers; on the other hand, when they are compared with those of a heterogeneous group of men, they appear to be very similar to other types of engineers. The common element of engineering then outweighs the peculiar elements of electricity and mechanics. What Strong apparently fails to fully appreciate, however, is the implication of Estes' and Horn's study for the development of specialized keys for the guidance of engineering or other students into specialties within their broader field. Instead of suggesting search along these lines, using the broad occupational group as the point of reference, Strong criticizes the experimenters' use of students rather than successfully employed men in developing their scales. The criticism is well made if the scales are proposed for actual use, but it would be unfortunate if focusing attention on this point diverted it from the real problem, namely, the use of specialized points of reference when studying specialties within an occupation.

The fundamental *similarity of the interests of all persons* is another fact which should be mentioned in connection with Strong's work on the differentiation of occupations. The interests of psychologists having for long been primarily in the field of differential psychology, studies of interests have been focused on the differences between groups of various types, whether they were classified by occupation, curriculum, avocation, race, sex, or age. Generally alert for by-products of his work, Strong noticed that his scoring keys for group differences are generally based on a relatively small proportion of the total number of items in his inventory, which in turn led to the finding that the likes of persons in



various categories are rather highly correlated (91). This is probably a good thing for counselors to keep in mind, by way of retaining perspective when using the occupational keys. The interests of boys and men, of men and women, of lawyers and foresters, resemble each other more than they differ. The interests of boys and women, the two most different groups, have a correlation coefficient of .48. This is as high as that for identical twins.

*Statistical Procedures.* It seems appropriate, in reviewing a monograph such as this, to comment briefly on the *adequacy of the statistical techniques* used by the author of the numerous studies reported therein. It has already been pointed out that, in solving the complex problem of devising a scoring technique for an interest inventory, Strong wisely sought and used expert statistical advice, and then improved upon the method himself (609). One of these improvements consisted of expressing data in percentages instead of in raw numbers, thus making it possible to read weights from a table instead of substituting in the formula for each alternative response to each item—a total of 1200 equations for one occupational group! Another consisted of reducing the six-fold to a four-fold table by contrasting those who chose a response with those who did not choose it, rather than with those who chose each possible other response. When Kelley, his former consultant, devised improvements in the weighting formula, Strong constructed two experimental sets of keys for five occupations (quite a task in itself), and put them to an empirical test. When the experiment showed that one of the revised procedures had more differentiating power than the old formula, Strong adopted it for his revised form (613). On the other hand, when simplified procedures were devised, tried out, and found promising by Dunlap, and when his own experiments showed that, although good, they were less discriminating than the standard method, Strong rejected the proposed changes (633). His grounds were that sound counseling requires the most effective possible methods even though the expense is thereby somewhat increased. Similarly, when Thurstone applied factor analyses to his test with promising results, Strong carried on from there (Ch. 14). Such thoroughness leaves little for the reviewer to say.

A few interesting *statistical by-products* of Strong's work are worth noting. On pages 113–114 Strong reports a rather high mean accountant score for certified public accountants (42.60 as compared with a mean standard score of 49.44 for accountants), but a rather low correlation between scores on the two relevant scales (.28). An analysis of the scores showed that C.P.A.'s making scores of A on their own scale had accountant scores ranging from 12 to 62 and correlating not at all with each other (no data are given), whereas the scores of other C.P.A.'s correlated fairly highly on the two scales. Strong concludes that C.P.A.'s have many interests in common with accountants, as is revealed by the high mean accountant score, but that fact is not revealed by the correlation, which shows little relationship between the rank order of scores in the two occupations. As the author points out, in this case neither means nor correlations seem to tell the whole story.

In another instance, Strong seems to have missed an important implication for statistical work. In Chapter 17, in which he discusses the interpretation of *interest profiles*, Strong advocates the plotting of interest inventory scores in profile form, and supplies a wealth of material illustrating and making possible the use of scores on more than one occupation when deciding whether the choice of a particular occupation is wise. That the consideration of supporting scores (e.g., medical or engineering interests in psychologists) is important in guidance is very true. But when, on page 414, Strong rejects the statisti-



cal combination of test scores, he is guilty of a basic inconsistency. If his inventory technique, consisting of a statistical summation of interests in specific occupations and activities, provides useful information not made available by a clinical study of responses to the specific items in the inventory, why should not a statistical summation of scores on interest scales provide data as useful as the clinical study of those test scores? This suggestion of the reviewer's should not be taken as a suggestion that the clinical study of the scale scores is not valuable: it is, and so is the study of responses to specific items in the inventory, as Shellow has reported. Knowing the relative physicist and physician scores of an embryo psychologist, for example, could be useful in deciding between emphases in experimental and clinical psychology. But a statistical combination of these test scores could, as Strong's own arguments for the consideration of primary, secondary, and tertiary interests imply (432-448), provide an even more valid interest score for any given occupation. As Strong points out, it is dangerous to recommend an occupation on the basis of a high score in that occupation alone. This score, he states, should be supported by high scores in related occupations. Why not indicate this support by a combination of scores on related occupations?

Such minor defects are much more than compensated for by recognition of the futility of using statistical techniques which are more refined than the data warrant (e.g., page 301), and by a commendable caution when small numbers are involved (e.g., in connection with Segel's interesting work, page 529), this latter virtue being one the importance of which many aviation psychologists have come to appreciate during the past three years. In spite of the few defects discussed in the last two paragraphs, Strong's work shows a remarkable freedom from statistical weaknesses, especially in view of the long period over which it was spread and the variety and complexity of the problems studied.

*Random Notes.* No study of this sort would be complete if it did not yield some results which are somewhat amusing, rather difficult to accept, and challenging to further work. They are the topics on which popularizers of psychology thrive, and the asides which enable a professor to awaken, momentarily, the drowsier students in the back of his classroom. A few such findings are briefly noted here, as being too good not to be shared.

Most of us think of scientific psychology as an interest of rather mature persons. Certainly few students choose it as a major until rather later than most such choices are made. But the *interest maturity* of psychologists (full members of the A.P.A. in the late 1920's) is comparable to that of the average 20 year-old! We may take comfort, however, in the fact that those respectable scientists, the mathematicians and physicists, and members of the esteemed medical profession, are the equals only of 17 year-olds. YMCA secretaries, school administrators, and ministers have the highest interest maturity scores. For all this there is good evidence. But that is another story, the telling of which will be found in Strong's Chapter 12.

Widely held stereotypes concerning the *attitudes and values* of men engaged in various occupations have been confirmed by a number of studies of the relationship of interest inventory scores or occupational membership to scores on attitude tests and value scales: Strong cites Allport, Duffy and Crissy, Wickert, and others (342 f.). Evidence such as this had led the reviewer to expect men in various occupations to answer Part VI of Strong's blank in ways which seem to be contradicted by Strong's conclusions. He reports (101) that men tend to value most that which they lack: skilled workers consider steadiness and permanence of work most important, and clerical workers value opportunities for pro-



motion above all. If the contradiction between responses to Strong's values items and the results of studies with values tests were as general as Strong suggests, professional men should not value freedom to devise their own methods and opportunity to use all of their knowledge as highly as some other things. But they do actually rate these highest (Table 19, p. 102). Does this mean that Strong's conclusion concerning the desire for that which is lacking is mistaken, or does it mean that professional men do not actually have sufficient opportunity to follow their own methods and to use all of their knowledge? Perhaps some groups respond in terms of what they lack, others in terms of what they have and seek (relatively speaking) still more of; or perhaps Strong's list of values is not sufficiently inclusive.

Another suggestion of Strong's should be referred to briefly, because it, too, should stimulate some worthwhile research. On page 441 he writes:

The writer has a hunch that the general level of the half-dozen highest ratings is a rough measure of the *amount of motivation* that the individual has at his disposal for working hard and making a success. Men with low ratings have given the impression of being 'drifters.' This topic needs careful investigation.

Strong and his publishers, to whom applied psychologists are becoming increasingly indebted, have done an excellent job of preparing the manuscript and putting it into print. The table of contents is well organized and very detailed, the topic headings are numerous and meaningful, the index adequate and accurate. In view of the vast amount of material that has been correctly reproduced in this lengthy volume, it seems like the act of a petty critic to point out a few errors that have been noted. To do so, however, may be of value to a few readers; it will gratify the reviewer's desire to show that others, too, are fallible; and it will show, by the very brevity of the list, how accurately Strong and Stanford have done their work. Brainard's test (522) is not the *Activities Inventory*, but the *Specific Interest Inventory*. The last sentence of the second paragraph on page 642 should refer, not to Table 165, but to Table 166. And Fryer, the first summarizer of interest test research, after having had his name spelled correctly a dozen times, surely deserves to have it spelled properly the last two times, on page 658 and in the index.

*Envoi.* Strong refers to "man's reluctance to think unless he absolutely has to" as a reason for students' failing to make adequate analyses of occupations and of their interests when choosing an occupation (33). This relatively brief and necessarily selective discussion of a few sections and topics of the "*Vocational Interests of Men and Women*" has sufficed, it is hoped, to bring out Strong's willingness to think about his problem and his data, his persistence in following up new problems as they arose, his skill in putting his findings to use in the refinement of his test, and the ability with which he has organized and presented his work in this volume. Many of Strong's important findings have not even been mentioned in the review, and some of the interesting problems raised by his work have not been touched upon. The volume is a gold mine for students in search of thesis topics. But one cannot hope to deal adequately with a classic in a single review, especially when the subject of the book is twenty years of research. If some idea of the importance of the work has been conveyed, if interest has been fostered in a few problems, and if the reader has been stimulated to a thoughtful study of Strong's book, this review has accomplished its purpose.



# A COMPARISON OF THE PERFORMANCE OF FRESHMEN AND SOPHOMORES IN GENERAL PSYCHOLOGY

HOWARD L. ROY

*University of Minnesota*

For several years after psychology was made a part of the college curriculum it was taught almost exclusively to upper classmen, presumably on the grounds that upper classmen could more readily grasp its concepts. Gradually the course in general psychology was moved downward in the curriculum until it reached the sophomore level. In a large number of colleges and universities psychology is still open to students only after they have attained sophomore status. A survey of the catalogues of 250 colleges and universities, reported in 1941, showed "that in 44 per cent of the cases freshmen are permitted to elect psychology and in 53.3 per cent sophomores or 'sophomores, juniors and seniors.' Only 3.5 per cent restrict registration to upper classmen" (2).

The acceleration of education brought about by the war has again raised some questions concerning the placement of psychology in the curriculum. What background and training are necessary for the course in general psychology? Are there bases other than possible convenience in programming for holding students out of psychology until the sophomore year? Do groups of freshmen and sophomores, equated or matched on the basis of scholastic aptitude, earn the same grades in general psychology? Two studies published in 1941, before colleges were much affected by acceleration, bear on these questions.

A. R. Gilliland (2) investigated the grade records of freshmen and sophomores matched as to intellectual ability at Indiana University and at Northwestern University. He found small differences in favor of the sophomores in both cases but they were too small to be practically significant and since the critical ratios did not exceed 3.00, he judged them to be not statistically significant. Gilliland concluded "that specific prerequisites in terms of courses or hours of credit are not necessary for courses in general psychology." Although Gilliland does not explicitly say so, it is possible that the practice of giving general psychology to freshmen and sophomores is usual or customary in these institutions and that the course has been adjusted to meet the needs of freshmen.

M. B. Fisher (1) compared the performance of 44 freshman women and 37 sophomore women in a beginning psychology course at Rhode Island State College. He matched the groups as to age and rank on the American Council on Education Psychological Examination. Differences were slight but consistently in favor of sophomores on several objective quizzes and the final examination. The critical ratios are not large enough to make the differences statistically significant. The size of the differences may have been reduced by the fact the freshmen were taught in a class by themselves and "more attention was given in the freshman section to the matter of how to study for a college course and this course in particular." The critical ratios may have been smaller than they should have been because of the small size of the samples. The author concludes by writing, "If these girls are a fair sample of college students, we should always expect a slight inferiority on the part of freshmen as compared with sophomores. But we should also expect to overcome this inferiority to a considerable extent, by some satisfactory orientation procedure and by specific directions on how to study."



The present study is concerned with the comparison of the performance of freshmen and sophomores in the beginning course in psychology at the University of Minnesota. In the fall of 1943 the class in general psychology was opened to freshmen for the first time, without qualification. Fortunately, for purposes of comparison, a large number of freshmen enrolled in the class.

The samples used in the study were limited to freshmen with no previous college experience and to sophomores with at least 3 quarters of college work prior to registration in the course. Adult special students were omitted from the study because of the irregularity of their background. Only people were used for whom there was available a percentile rank on the American Council on Education Psychological Examination and a percentile rank in the high school class from which the individual was graduated. These limitations reduced our samples to 209 freshmen and 218 sophomores. There is no reason to believe that these samples are not representative of the entire class. The measure of fitness for college used at Minnesota is the college aptitude rating (CAR). This rating is obtained by adding the high school percentile rank and psychological examination percentile rank and dividing by 2. This measure, which will be referred to hereafter as CAR, was used in matching our freshman and sophomore groups.

The class in psychology met in two sections with about equal numbers of freshmen and sophomores in each section. There were three 50-minute lecture periods per week. Objective examinations were held at mid-term and at the end of the fall term.

The performance of the two groups is shown in Table I. They are compared here without regard to ability. The honor point ratios (HPR) computed from the data in Table I are 0.866 for the freshmen and 1.298 for the sophomores. It was the relatively poorer performance of the freshmen which is apparent in this table that led the writer to investigate further the matter of prerequisite training for the course.

TABLE I  
NUMBER AND PER CENT OF FRESHMEN AND SOPHOMORES  
EARNING A's, B's, ETC. IN PSYCHOLOGY

209 Freshmen			218 Sophomores		
	No.	%		No.	%
A	9	4.3	A	25	11.5
B	28	13.4	B	47	21.5
C	98	46.8	C	114	52.3
D	42	20.1	D	25	11.5
F	32	15.3	F	7	3.3
Total	209	99.9		218	100.1

Table II shows the distribution of these freshman and sophomore members of the class according to the CAR measure of fitness for college. The distributions are quite similar when it is considered that many students do not return to college for a second year and at least a part of this mortality is thought to be a function of ability.

Table III shows the per cent of freshmen and sophomores in each CAR decile earning A or B, C, and D or F. Here again it is apparent that the sophomores are more successful in getting satisfactory grades than are the freshmen.



TABLE II

DISTRIBUTION OF FRESHMAN AND SOPHOMORE MEMBERS OF THE CLASS ACCORDING TO CAR PERCENTILE RANK

CAR %ile Ranks	209 Freshmen		218 Sophomores	
	No.	%	No.	%
90-100	25	12.4	32	14.7
80-89	26	12.4	40	18.3
70-79	44	21.1	45	20.6
60-69	35	16.7	44	20.2
50-59	41	19.6	26	11.9
40-49	27	12.9	20	9.2
30-39	8	3.8	8	3.7
20-29	1	0.5	2	0.9
10-19			1	0.5
0-9	1	0.5	—	—
Totals	209	99.9	218	100.0

TABLE III

PER CENT OF FRESHMEN AND SOPHOMORES IN EACH CAR DECILE EARNING A OR B, C, D OR F\*†

CAR %ile Ranks	209 Freshmen			218 Sophomores		
	A or B	C	D or F	A or B	C	D or F
90-100	50.0	46.2	3.8	75.0	25.0	
80-89	38.5	53.8	7.7	30.0	57.5	12.5
70-79	15.9	70.5	13.6	31.1	55.6	13.3
60-69	5.7	40.0	54.3	22.7	56.8	20.4
50-59	7.3	34.1	58.5	30.8	57.7	11.5
40-49	7.4	37.0	55.5	10.0	70.0	20.0
30-39		25.0	75.0	25.0	37.5	37.5
20-29			100.0**		50.0	50.0
10-19						100.0**
0-9		100.0**				

\* To reduce the amount of detail in the table Grades A and B have been combined, C stands alone, and D has been combined with F.

† The absence of cases in the lower deciles is due to the policy of ordinarily not admitting freshmen below the 40th percentile to the Arts College.

\*\* These percentages have little significance since each represents a single isolated case as can be seen in Table II.

In order to hold constant "fitness for college" so as to bring into sharper focus any differences existing between the two classes, the same number of freshmen and sophomores was placed in each CAR decile. This was done by eliminating, by lot, the excess individuals in one class or the other for each



decile. It is believed eliminations worked no hardship on either class. Table IV presents the number of freshmen and sophomores in each CAR decile earning grades of A or B, C, and D or F when there are equal numbers of freshmen and sophomores in each decile.

TABLE IV  
DISTRIBUTION OF GRADES BY CAR DECILES WITH EQUAL NUMBERS  
OF FRESHMEN AND SOPHOMORES IN EACH DECILE\*

<i>CAR %ile</i>	<i>186 Freshmen</i>				<i>186 Sophomores</i>			
<i>Ranks</i>	<i>A or B</i>	<i>C</i>	<i>D or F</i>	<i>Totals</i>	<i>A or B</i>	<i>C</i>	<i>D or F</i>	<i>Totals</i>
90-100	13	12	1	26	19	7		26
80-89	10	14	2	26	9	12	5	26
70-79	7	31	6	44	14	24	6	44
60-69	2	14	19	35	6	21	8	35
50-59	2	9	15	26	8	15	3	26
40-49	1	8	11	20	2	14	4	20
30-39		2	6	8	2	3	3	8
20-29			1	1			1	1
10-19								
0-9								
Totals	35	90	61	186	60	96	30	186

\* The absence of cases in the lower deciles is due to the policy of ordinarily not admitting freshmen below the 40th percentile to the Arts College.

It will be observed that there continues to be a difference between freshmen and sophomores. The HPR for freshmen computed from the data of Table IV is 0.909 and that for the sophomores is 1.258. This difference is important, for it means that the average grade earned by these freshmen is below the level accepted as satisfactory by the Arts College while that earned by the sophomores is above the level accepted as satisfactory. The Chi-square test for significance of difference was applied to the data of Table IV and yielded a Chi-square of 17.3 with a P of less than 0.01. Thus the chances are less than 1 in 100 that differences as large as these would have arisen from errors of random sampling.

The ability of the students as measured by the ACE Psychological Examination was also used to match the freshmen and sophomore sections. The results were practically the same, however, the difference between the classes was a bit larger.

The results of this study are in line with the two studies mentioned above inasmuch as all three show differences in favor of sophomores. In the case of the students at Minnesota the difference appears to be larger and to be statistically and practically significant. It is possible, of course, as Fisher suggests, that these differences could be reduced by teaching the freshmen separately and giving special attention to how to study. Under conditions as they are, however, it seems to the writer that there are grounds for requiring some college experience (perhaps not a full year) before registration in general psychology in the University of Minnesota. In the writer's opinion sophomores differ from freshmen of equal ability in having learned to take lecture notes, to stress important facts and principles, and in general to manage their time and efforts more efficiently. If this is true, freshmen, if they are to be taught psychology, should not be forced to compete with sophomores. They should continue as in the past to enroll in courses primarily open to freshmen.



## SUMMARY

1. The performance in general psychology of 209 freshmen and 218 sophomores matched as to ability was compared at the University of Minnesota.
2. Sophomores earned a grade average above the satisfactory level. Freshmen earned a grade average slightly below satisfactory level.
3. These results are in line with the trends reported in 2 other studies but the writer regards the difference reported here as significant while the writers mentioned above did not regard the differences they found as large enough to be significant.
4. The writer believes the prerequisite of "some" college experience for admission to general psychology is a benefit to the freshmen if they are forced to compete with sophomores.

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# HUMAN NATURE AND THE PEACE

GORDON W. ALLPORT

On April 5, 1945, there was released to the press a Statement signed by 2,038 American psychologists. This statement had its origin during the summer of 1944 in informal conversations among psychologists, about twenty-five of whom contributed to its formulation. Although at no time was the Statement officially sponsored by any psychological organization, the funds for printing and mailing were supplied by the Society for the Psychological Study of Social Issues, and the recipients of the Statement were the 3,803 members and associates of the American Psychological Association listed in its 1944 Yearbook. The covering letter soliciting endorsements was signed by the following group of psychologists: G. W. Allport, R. S. Crutchfield, H. B. English, Edna Heider, E. R. Hilgard, O. Klineberg, R. Likert, M. A. May, O. H. Mowrer, G. Murphy, C. C. Pratt, W. S. Taylor, and E. C. Tolman.

While many mail solicitations bring only 25 per cent response and while many psychologists were abroad in war service and hard to reach, the result of this call brought more than a 50 per cent response. Among those replying more than 99 per cent subscribed to the Statement. Included among the signers are 350 clinical psychologists, 230 industrial psychologists, approximately 250 in other fields of applied psychology, and approximately 300 in the armed services. The remainder are in universities and colleges. Minor comments and suggestions were received from 92 individuals. There were only thirteen refusals to sign.

Besides being printed in newspapers, the Statement was sent to 535 representatives and senators in the United States Congress, and to many organizations and individuals prominently concerned with peace-planning and international cooperation. The Statement likewise is printed in the recent Yearbook of the SPSSI, *Human Nature and Enduring Peace*, edited by Gardner Murphy.

The full text of the statement follows:

## HUMAN NATURE AND THE PEACE

### A STATEMENT BY PSYCHOLOGISTS

Humanity's demand for lasting peace leads us as students of human nature to assert ten pertinent and basic principles which should be considered in planning the peace. Neglect of them may breed new wars, no matter how well-intentioned our political leaders may be.

1. *War can be avoided: War is not born in men; it is built into men.*

No race, nation, or social group is inevitably warlike. The frustrations and conflicting interests which lie at the root of aggressive wars can be reduced and re-directed by social engineering. Men can realize their ambitions within the framework of human cooperation and can direct their aggressions against those natural obstacles that thwart them in the attainment of their goals.

2. *In planning for permanent peace, the coming generation should be the primary focus of attention.*

Children are plastic; they will readily accept symbols of unity and an international way of thinking in which imperialism, prejudice, insecurity, and ignorance are minimized. In appealing to older people, chief stress should be laid upon economic, political, and educational plans that are appropriate to a new generation, for older people, as a rule, desire above all else, better conditions and opportunities for their children.



3. *Racial, national, and group hatreds can, to a considerable degree, be controlled.*

Through education and experience people can learn that their prejudiced ideas about the English, the Russians, the Japanese, Catholics, Jews, Negroes, are misleading or altogether false. They can learn that members of one racial, national, or cultural group are basically similar to those of other groups, and have similar problems, hopes, aspirations, and needs. Prejudice is a matter of attitudes, and attitudes are to a considerable extent a matter of training and information.

4. *Condescension toward "inferior" groups destroys our chance for a lasting peace.*

The white man must be freed of his concept of the "white man's burden." The English-speaking peoples are only a tenth of the world's population; those of white skin only a third. The great dark-skinned populations of Asia and Africa, which are already moving toward a greater independence in their own affairs, hold the ultimate key to a stable peace. The time has come for a more equal participation of all branches of the human family in a plan for collective security.

5. *Liberated and enemy peoples must participate in planning their own destiny.*

Complete outside authority imposed on liberated and enemy peoples without any participation by them will not be accepted and will lead only to further disruptions of the peace. The common people of all countries must not only feel that their political and economic future holds genuine hope for themselves and for their children, but must also feel that they themselves have the responsibility for its achievement.

6. *The confusion of defeated people will call for clarity and consistency in the application of rewards and punishments.*

Reconstruction will not be possible so long as the German and Japanese people are confused as to their status. A clear-cut and easily understood definition of war-guilt is essential. Consistent severity toward those who are judged guilty, and consistent official friendliness toward democratic elements, is a necessary policy.

7. *If properly administered, relief and rehabilitation can lead to self-reliance and cooperation; if improperly, to resentment and hatred.*

Unless liberated people (and enemy people) are given an opportunity to work in a self-respecting manner for the food and relief they receive, they are likely to harbor bitterness and resentment, since our bounty will be regarded by them as unearned charity, dollar imperialism, or bribery. No people can long tolerate such injuries to self-respect.

8. *The root-desires of the common people of all lands are the safest guide to framing a peace.*

Disrespect for the common man is characteristic of fascism and of all forms of tyranny. The man in the street does not claim to understand the complexities of economics and politics, but he is clear as to the general directions in which he wishes to progress. His will can be studied (by adaptations of the public opinion poll). His expressed aspirations should even now be a major guide to policy.



9. *The trend of human relationships is toward ever wider units of collective security.*

From the caveman to the twentieth century, human beings have formed larger and larger working and living groups. Families merged into clans, clans into states, and states into nations. The United States are not 48 threats to each other's safety; they work together. At the present moment the majority of our people regard the time as ripe for regional and world organization, and believe that the initiative should be taken by the United States of America.

10. *Commitments now may prevent postwar apathy and reaction.*

Unless binding commitments are made and initial steps taken now, people may have a tendency after the war to turn away from international problems and to become preoccupied once again with narrower interests. This regression to a new postwar provincialism would breed the conditions for a new world war. Now is the time to prevent this backward step, and to assert through binding action that increased unity among the people of the world is the goal we intend to attain.



# PSYCHOLOGY AND THE WAR

Edited by  
DONALD G. MARQUIS

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## ARMY SEPARATION CLASSIFICATION AND COUNSELING: I. OBJECTIVES AND DEVELOPMENT\*

### STAFF, SEPARATION COUNSELING SUBSECTION, CLASSIFICATION AND REPLACEMENT BRANCH, THE ADJUTANT GENERAL'S OFFICE

Readers of the Bulletin will be familiar with the work of the Classification and Replacement Branch of The Adjutant General's Office, and its responsibilities in connection with Army personnel procedures. Previous articles by the Staff, Personnel Research Section, have dealt with the development of classification testing and with the general procedures of military classification, selection, and assignment.†

Since the early years of the war, there has been a growing realization that the military classification system, functioning "in reverse," might perform a valuable service in connection with the relocation and readjustment of veterans. There are available, through the operation of the Army classification system, records covering the pre-service and in-service educational and occupational history of each soldier and his scores on selected Army ability and aptitude tests.

\* First of a series of four articles. Subsequent papers will discuss in detail Separation Center Procedures, Hospital Procedures, and Materials and Training.

† Personnel Research in the Army: I, II, III, IV, V, and VI. *Psychol. Bull.* 1943, 40, 129-135, 205-211, 271-281, 357-371, 429-435, 499-508.



It is clear that this information could be used effectively in a separation classification and counseling program to assist a serviceman in making plans for his return to civilian life.

During the summer of 1943, the Classification and Replacement Branch began formal consideration of the classification aspects of discharge and re-employment procedures. In August of that year the Special Planning Division of the War Department Special Staff outlined the Army's responsibilities with regard to separation and discharge and requested The Adjutant General to study separation classification and counseling procedures and make appropriate recommendations. The Classification and Replacement Branch, to whom this request was referred, began to develop certain techniques and procedures for Separation Classification and Counseling which were subsequently tried out in an experimental situation.

### A. OBJECTIVES

The over-all objective of Separation Classification and Counseling is to provide the soldier about to leave the service with the information and guidance necessary for him to initiate his readjustment to civilian life. In brief, it seeks to assist the soldier in bridging the gap between military and civilian life.

It was decided that this objective could be achieved most effectively through a program of vocational and educational counseling in which the soldier would be given individual counseling, at the time of discharge, and provided with a transcript of Army experience which he could use in getting a job or applying for additional schooling. This transcript should include a summary of the man's military training and experience and a translation of them into related civilian occupations. Specifically, the accomplishment of the objective of Separation Classification and Counseling would involve:

1. the preparation of a record summarizing the soldier's educational history, his civilian occupational background, and his Army training and experience;
2. an opportunity to ask and have answers to specific questions concerning his discharge from the service, and his rights and benefits as a veteran;
3. an opportunity to discuss his future educational and vocational plans with a well-informed counselor; and
4. accurate referrals to governmental and other agencies both within and outside the Army interested in assisting the veteran in his readjustment to civilian life.

### B. EARLY PROCEDURES

Efforts were initially directed toward the preparation of a technical manual which would outline the procedures and techniques of Separation Classification and Counseling, and the development of a form which would summarize the soldier's Army experience from the military records available at the time of separation, supplemented by an interview with the soldier.

After frequent consultation with representatives of industry, education, and governmental agencies, a Separation Qualification Record (WD AGO Form 100) was developed. Basically, Form 100 as shown in Figure I, is a brief summary of the soldier's civilian and military educational and occupational history, with a conversion of civilian and military skills and training to related civilian jobs. These conversions are made by the counselor by reference to *Special Aids for Placing Military Personnel in Civilian Jobs*, and *Part IV of the Dictionary of Occupational Titles* both prepared by the War Manpower Commission.



# ARMY SEPARATION QUALIFICATION RECORD

LAST NAME - FIRST NAME - MIDDLE INITIAL <b>BRACKER JOHN T</b>		ARMY SERIAL NUMBER <b>342981189</b>	GRADE <b>SGT</b>	DATE OF ENTRY INTO ACTIVE SERVICE <b>3 Feb 43</b>	SEX <b>M</b>	DATE OF BIRTH <b>22 Oct 99</b>
PERMANENT ADDRESS FOR MAILING PURPOSES (Street and Number - City - County - State) <b>913 Roanoke Street, Seattle, King Co., Washington</b>						
HIGHEST GRADE COMPLETED <b>7</b>		LAST YEAR OF ATTENDANCE <b>1913</b>	HIGHEST DEGREE RECEIVED <b>None</b>	MAJOR COURSE OF STUDY <b>None</b>	NAME AND ADDRESS OF LAST SCHOOL ATTENDED <b>Benton School, Renton, Washington</b>	
OTHER TRAINING OR SCHOOLING						
COURSE	NO. WKS.	COURSE	NO. WKS.	COURSE	NO. WKS.	COURSE
Typing	24					
SERVICE EDUCATION						
SERVICE SCHOOL	COURSE	RES. OR HNS	RATING	ARMY SPECIALIZED TRAINING PROGRAM		
110 Artillery	Supply Clerk	3w	VS	INSTITUTION WHERE ENROLLED	CURRICULUM AND TERM (COURSE OF TRAINING PURSUED)	NO. OF WEEKS
				None		
CIVILIAN OCCUPATIONS						
MAIN OCCUPATION (TYPE)			SECONDARY OCCUPATION (TYPE)			
<b>MAIL CLERK</b>			<b>ROOM CLERK</b>			
JOB SUMMARY			JOB SUMMARY			
Received, sorted, and distributed incoming and outgoing mail. Also substituted as carrier during holiday seasons.			Registered incoming guests and assigned rooms in a small hotel. Checked out departing guests and received payment of their accounts. Also has had some experience as bellboy, waiter, and porter. Operated switchboard as part of duties as clerk.			
NO. OF YEARS NEXT	LAST DATE OF EMPLOY.	NAME AND ADDRESS OF EMPLOYER	NO. OF YEARS NEXT	LAST DATE OF EMPLOY.	NAME AND ADDRESS OF EMPLOYER	
7 1/2	Sep 42	Post Office, Renton, Wn.	13	Oct 33	Alaska Hotel, Pine Street, Seattle, Washington.	
MILITARY SPECIALTIES						
YEARS	MONTHS	GRADE	PRINCIPAL DUTY	ARMY CODE NO.	YEARS	MONTHS
1	0	SGT	Supply Clerk	835		
0	2	PPC	Mail Orderly	055		
SUMMARY OF MILITARY OCCUPATION AND CIVILIAN CONVERSIONS (Shown by title)						
SUPPLY CLERK: Performs various clerical and stock-handling duties in connection with receipt, storage, issue, and shipping of general supplies and equipment. Handles invoices, requisitions, bills of lading, etc. Assists in taking inventory. Maintains stock records, anticipates and estimates needs.				CIVILIAN CONVERSIONS: Receiving Clerk III Shipping Clerk I, II Stock Control Clerk		
SUMMARY OF MILITARY OCCUPATION AND CIVILIAN CONVERSIONS (Shown by title)						
MAIL ORDERLY: Performs general military office work not requiring the use of a typewriter. Takes telephone messages and gives information to callers. Does simple bookkeeping. Sorts and distributes mail.				CIVILIAN CONVERSIONS: Clerk, general		
* THIS INFORMATION BASED ON SOLDIER'S STATEMENT. (Indicate by * any items not supported by military records)						
DATE OF SEPARATION	SIGNATURE OF SOLDIER			SIGNATURE OF SEPARATION CLASSIFICATION OFFICER		
1 Aug 44	<i>John T. Bracker</i>			<i>Ralph P. Mullin</i> Ralph P. Mullin Capt AGD		

W.D., A.G.O. FORM NO. 100 15 July 1948

Figure 1

In order to test the plans and procedures formulated, approval was granted by the War Department Special Planning Division to make an initial selection of officer and enlisted counselors, set up a short training course for them, and to initiate experimental counseling activities at specified points of separation. A two-week course for counselors was held in New York City, in which refresher training in counseling techniques and procedures, filling out of Form 100, and the functions of such referral agencies as the Veterans Administration, Selective



Service System, United States Employment Service, American Red Cross, United States Civil Service, and other interested agencies was provided.

Following the school certain officers and enlisted men were assigned to an experimental separation center for processing of able-bodied men at Fort Slocum, New York, on 14 February 1944. This center was concerned with the complete discharge process of which separation classification and counseling was an integral part. The center completed the soldier's Army records, examined his equipment, gave him his final physical examinations, prepared his discharge papers, and provided him an opportunity for personal counseling. By the end of March, the Fort Slocum experiment had been officially approved by the War Department, and the first permanent separation center activated at Fort Dix, New Jersey on 30 March 1944.

One officer and one enlisted man from the initial class were assigned to Tilton General Hospital, Fort Dix, New Jersey for a similar trial period. Separation counseling soon became an important part of final processing at the hospital and received the official approval of the War Department. The work which was started at Tilton General Hospital has now been extended to other Army general, regional, station, and convalescent hospitals in the United States.

### C. PREPARATION OF COUNSELORS

In extending the program to all points of separation, it was recognized immediately that the effectiveness of the counseling procedure would depend upon a staff of able counselors who could approach each soldier leaving the service with a real concern for his welfare and an appreciation of the problems he was facing. Accordingly, a plan for securing and training military counselors was submitted to the Chief of Staff, Army Service Forces, 28 April 1944 and approval was obtained to establish a service school at Fort Dix, New Jersey to train separation classification and counseling personnel on the materials and techniques of vocational and educational counseling. The first class, which continued for five weeks, began 22 July 1944. At the beginning of the third class, 14 October 1944, the course was reduced to four weeks.

Both officer and enlisted personnel selected for training at the school must meet the minimal requirements of age, 25 years, and Army General Classification Score, 110. Personal qualifications considered essential are the ability to become acquainted quickly with people, to evaluate them intelligently, and to win rather than command cooperation. Preference is given to the more mature individuals, and those with considerable experience in Army personnel procedures. Enlisted men are required to have completed at least two years of college or university, including courses in psychology, personnel administration, business administration, industrial management, or social administration. Graduation from a four-year college or university, with courses in the same subjects, is required of officers. In addition to the educational qualifications, a minimum of two years' civilian experience is required of both officers and enlisted men in any one of the fields of vocational and educational counseling, social service, school administration or teaching, personnel administration, occupational classification, interviewing, or business at the executive level. An additional two years of work experience may be substituted for two years of college training for either officers or enlisted men. Military experience in personnel work may be substituted in equivalent amount for civilian occupational experience.

The faculty teaching the Separation Classification and Counseling Course



includes officers and enlisted men qualified by active participation in counseling, both in the Army and in civilian life. The objectives of the course are to orient the men to Separation Classification and Counseling, to give them experience in the use of the tools employed by counselors, to give them information on Army regulations with respect to discharge, to provide them with information on educational, industrial, and occupational conditions in the communities to which the veterans will return, and to acquaint them with the various agencies concerned with the readjustment of veterans.

Effective 21 January 1945 the training course was transferred from Fort Dix, New Jersey to The Adjutant General's School, Fort Sam Houston, Texas where it became an integral part of The Adjutant General's personnel training program. Orders recently have been issued to move The Adjutant General's School from Fort Sam Houston, Texas to Camp Lee, Virginia on 2 May 1945.

#### D. OPERATIONS IN SEPARATION CENTERS

As a result of the experience of the last war, when the one all-absorbing question of the men seemed to be "How quickly can I get out of the Army?", it was decided to simplify the separation process so that a man who arrived at a separation center with his records reasonably complete would be on his way home within two days. To accomplish this it was necessary to develop streamlined machinery by which soldiers about to be discharged could be given a final physical examination, have their financial accounts put in order, paid, have their uniform and equipment checked, have the necessary records and forms brought up to date, and receive counseling—all in a period of forty-eight hours. It was decided as a matter of policy that counseling would have to be organized so that it would not retard the flow of men through the separation center. Consequently, the average time allowed for counseling a soldier has been about thirty-five minutes. Occasionally the interviews last as long as two hours, when the flow of discharges is relatively light or when special problems arise. This time limitation reduces the scope of counseling, but on the other hand, the effectiveness of the work would be more seriously impaired if the men felt that they were being delayed too long at the separation center.

All enlisted men and officers being separated from the service are required to have the Form 100 filled out by a counselor before leaving the separation center. The original copy of the Form is signed by an officer and given to the soldier for his own use. A carbon copy is mailed to the Veteran's Facility nearest the soldier's civilian residence. The soldier is given an opportunity during the time the Form 100 is being prepared to ask any questions he may have concerning his discharge and his rights and benefits as a veteran. Experience has shown that answering such questions is one of the most valuable contributions of the counselor at the Separation Center.

Some of the questions asked by the soldiers frequently lead into vocational, educational or personal problems. If the soldiers express a desire to pursue a problem further and to receive counseling on it, they are given the opportunity to do so. Such counseling, however, is entirely voluntary. To date, approximately sixty per cent of all soldiers processed at separation centers have expressed a desire for such counseling.

#### E. HOSPITAL PROCEDURES

Separation Classification and Counseling is provided likewise in Army regional, station, general, and convalescent hospitals. The separation counselor



*The Medical* completes the Form 100, answers the soldier's questions, and provides the soldier with an opportunity for vocational, educational, and personal counseling. Counseling in hospitals differs from that in separation centers chiefly in that the men being discharged have a physical disability which may affect their occupational readjustment. This, of course, increases the amount of time necessary for effective counseling. Such time is available at the hospital since it is possible to see the soldier three weeks or more prior to the time he is discharged, thus enabling the counselor to devote a longer period of time to each interview and to permit the soldier to return for additional interviews if he so desires.

#### F. MATERIALS

The military counselor has access to a large amount of information gathered through cooperative arrangements with governmental agencies, business, industry, labor organizations, and community welfare groups. A *Military Counselor's Kit* is furnished to each counselor. It includes pertinent Army regulations and manuals; such tools as the Dictionary of Occupational Titles, Interviewing Aids, and Special Aids for Placing Military Personnel in Civilian Jobs; materials dealing with educational opportunities, labor market information, rehabilitation and placement of the handicapped; and directories of national local agencies established to offer assistance or information to the ex-soldier.

In addition to materials immediately available in counseling booths, separation centers and hospitals maintain a *Library for Counselors* for more extensive reading or reference. Detailed information on many subjects considered useful to the counselor is included in this library. Information and reference materials are kept current through regular additions, changes, and periodic bulletins issued to all centers and hospitals by the Separation Counseling Sub-Section of The Adjutant General's Office.

There is also available at each separation center and hospital an *Occupational Library*. The library contains information on specific occupations in which the soldier may be interested and is provided for his use while he is in the process of separation. Duplicate copies of some of the materials are available for the soldier to take with him.

#### G. REFERRALS

The United States Employment Service, the Veterans Administration, the Selective Service System, the United States Civil Service Commission, and the American Red Cross have authorized representatives at separation centers and hospitals, and military counselors make referrals to them whenever they discover individuals who need expert assistance in the counseling areas of the respective agencies. These representatives also act as advisers to the military counselors and supply them with current information on the veterans' services of the various agencies.

Referrals are also made by the military counselors to governmental and civilian agencies outside the Army. Each counselor has in his *Counselor's Kit* a large number of directories which provide him with the names and addresses of various national agencies throughout the United States. From these the counselor provides each dischargée with the names and addresses of those agencies in his home community which are prepared to assist him in his civilian readjustment.



#### H. TESTING

No general testing program is administered to the soldiers at the time of separation from the service, but any separatee may request and be given standardized tests. Such requests occur at separation centers rarely, due to the limitation of time, but counselors at hospitals receive frequent requests for special tests. At both separation centers and hospitals the counselors have access to test scores of enlisted personnel which appear in their Army records.

#### I. CONCLUSION

Separation Classification and Counseling Sections, which are now established in hospitals and separation centers in all of the nine service commands in the United States, are providing the men who are being separated from the service with a personal copy of an official transcript of their Army experience, answering their questions concerning their discharge and their benefits as veterans, giving them an opportunity for personal counseling, and finally, referring them to those agencies in their home communities where they may obtain further assistance.

In setting up this program, the Army is only beginning a service which, if it is to be effective, must be continued by other agencies outside the Army. The job must be completed by civilian counselors. It is the responsibility of schools, colleges, employment agencies, social service groups, industry, labor organizations, and other community groups to take up the work which has only been started by the Army, and carry it through to a successful conclusion.



# AVIATION PSYCHOLOGY IN THE ARMY AIR FORCES

THOMAS W. HARRELL

*University of Illinois\**

This article outlines some studies and applications of aviation psychology in the Army Air Forces that are independent of the program of the Psychological Branch, Research Division, Air Surgeon's Office, recently described in the *Psychological Bulletin*. A few of these studies have been published, but the majority of them will probably not be published in detail until after the war. Some of the key personnel responsible for the programs will be cited, but no attempt will be made to mention all of the many psychologists who have collaborated.

Selection procedures have been studied for airplane mechanics and for several other ground technicians. These include airplane armorers, sheet metal workers, machinists, radio operators and mechanics, camera technicians, weather observers and forecasters, instrument specialists, cryptographers, and Link trainer operators and mechanics. (AAF civilian technicians are mentioned below.) Richard W. Faubion is prominently identified with almost all of these researches. He has been responsible for many studies correlating various test scores with class-room tests and shop performance. He has also assisted in developing an objective criterion of machinists' skill. Roger M. Bellows has collaborated in some of the studies mentioned above and has also compared performance ratings in tactical units to predictors of success in training. Contributors to various of these investigations have been Sidney Adams, Earle Cleveland, Carlton Wilder, Wendell Gray, Addison Clarke, and Edwin R. Henry.

Even before the war began, Carroll Shartle, Walter Studdiford, and associates had made considerable progress on the job analysis of all enlisted men's jobs in the AAF (as well as in the Army Ground and Service Forces). Translating these analyses into descriptions for use has been done largely by Army officers. The Adjutant General's Office has been responsible for the final printed product of AAF job descriptions as is true for all the Army.

In the AAF, Alvord Finn became by knowledge and position the authority on job descriptions. There has always been a problem in Army job descriptions as to how far to go in breaking down jobs so as to make the title specific and accurate. If too much refinement is introduced the system becomes so complicated as to become unwieldy. This complication has been particularly true of enlisted men's jobs, for which the Military Occupational Specialty Code Numbers have not been arranged in numerically meaningful family groups as is done in the code for officer titles or in the Dictionary of Occupational Titles. At a time when considerable confusion existed in the AAF occupational structure for enlisted men, because of considerable specificity and frequent changes in job titles and descriptions, Finn started to work. His product has been accepted as showing good judgment in reaching a proper balance between too much refinement and too crude groupings. The results are evidenced in the part dealing with occupational structure in AAF Manual 35-1, Military Personnel Classification and Duty Assignment.

Job analyses were also made of navigators and bombardiers, duties usually performed by officers. The fact that officer positions were not generally analyzed in the AAF had led naturally to the later job descriptions for officers

\* On leave, Major, Air Corps, A-1 Section, Hq. 15th Air Force.



being considerably inferior in accuracy to those for enlisted men. This greater attention to enlisted personnel procedures is fairly typical in the American Army, although in the German Army greater relative stress has been placed on officer personnel procedures.

Related to their job analyses were oral trade tests that Shartle and his associates developed. Beatrice Dvorak and Luigi Petrullo were directly responsible for these trade tests, almost all of which were originally standardized on samples in the civilian population. AAF as well as the rest of the Army has been authorized to use these trade tests. Their application to AAF enlisted men has been considerable and to civilian technicians has been less.

In April 1940, a study was begun of bombardier selection and training which preceded the later studies on this subject by the Air Surgeon. Faubion, L. L. Thurstone and Bellows analyzed the accuracy of practice bombings as a validity criterion. These bombings at first appeared to give an automatic index to the effectiveness of a bombardier. He either hits the target or misses it. In the case of misses the extent of error can be conveniently measured in unquestionably objective terms. As it turned out the reliability of practice bombings was so slight as to be useless. Bellows and Thurstone found that important variables which mask the influence of the bombardiers' skill are the pilots' skill, the aircraft and weather. Bellows contributed to improving the accuracy of a criterion of the success of bombardiers, and also made important studies of bombardier training.

Before the Air Surgeon took over the project of aerial navigator selection and training, Faubion, Wilder and Julien Christensen were studying it. It was early apparent that mathematics aptitude was the most important test predictor of navigator competence.

Prior to the introduction of the Aviation Cadet Qualifying Examination, educational achievement tests were used as an entrance requirement for training as pilot, bombardier, and navigator. The educational tests were shortened, improved in reliability, rendered susceptible to machine scoring, and used for one round by Clyde Coombs and associates in the Adjutant General's Office. A revision of the educational tests was completed but not used because of the acceptance of the Aviation Cadet Qualifying Examination.

Preliminary study of pilot selection was made by Faubion and C. E. Obermann, resulting in quite significant validity coefficients between records of success in flight training and test scores. This was shortly before the Air Surgeon's psychologists took over.

Although not nearly as well known by the public as personnel in uniform the AAF has a very large number of civilian employees. Classification tests for various technicians have been developed by Roger T. Lennon and earlier studies made by S. A. Switzer. Some materials developed by Shartle, Dvorak and Petrullo have been used in the studies and applications at the AAF Technical Service Command.

Synthesis of jobs into families based on similar work and similar aptitude and other personnel requirements has been accomplished by Shartle, Dvorak and Petrullo. Some of the job families were made up because of the interest of AAF and used by the AAF.

Since Army General Classification Test grades for all AAF enlisted men in the United States were punched on Hollerith cards, it has been possible to find the General Classification Test level by Military Occupational Specialty in a population of 800,000. Breakdowns were present between Air Corps and services such as Ordnance, Quartermaster, etc., with AAF.



Data showing approximately 100,000 AGCT scores for civilian occupations have been collected by Webster and Faubion and have been analysed by Margaret Strong Harrell.

A study of attitudes toward job assignment in a cross section of AAF enlisted men has been conducted by Samuel A. Stouffer and his staff. The results contributed to a major improvement in methods adopted for efficient assignment of military personnel. Advising Stouffer in this study were Quinn McNemar and Frank Stanton.

Development and application of methods of correct classification and efficient duty assignment of AAF officers and enlisted men have used the efforts of a number of psychologists. Some of these are Esco Obermann, Sidney Adams, Harry McNeill, Willis McCann, Alvord Finn, Thomas Snee, Carlton Wilder, and A. S. Switzer. These activities of Classification Officers are in large part personnel administration, but they do require some tasks of a professional psychological nature as well as utilizing psychological training in the personnel administrative phase of the duties. Training and supervising interviewers and clerks into a smooth running organization is a major duty of the first echelon Classification Officer which is probably not psychological in the professional sense. Psychological training does help. Actual interviewing by the Classification Officer is often a task requiring professional skill which will be referred to in connection with the activities of Personnel Consultants which merge at some areas into those of Classification Officers. Interpretation and administration of classification and aptitude tests are often professional chores. Particularly the third and fourth echelon Classification Officers have been engaged in making job analyses, job descriptions, and psychographs of characteristics most necessary for success in certain jobs.

During 1943, Classification and Personnel officers in the AAF developed and prosecuted a program of classification and duty assignment that was outstanding in the Army. Some of the important phases were:

1. Training of an enlisted specialist to maintain records on classification and duty assignment in each squadron and group. Dozens of men trained in the ASTP course in personnel psychology augmented the total number which ran well into four digits.
2. Increasing the importance of the Classification Officer in higher headquarters by authorizing a higher rank. For example, in several Air Force Headquarters the authorized rank for the Classification Officer was increased from First Lieutenant to Lt. Colonel.
3. Preparation and distribution of a digest of Army Regulations, AAF Regulations, and other directives so that each busy squadron commander had a single document giving procedures in correct classification and duty assignment.
4. Traveling personnel classification audit teams to indoctrinate key command and key staff personnel, and to discover existing malassignments and recommend their correction.

The results of the aggressive prosecution of correct classification and assignment led to a significantly better use of the training of technicians, an improvement which was measured in an inspection of a cross-section of units. It also led naturally to a greater classification consciousness on the part of commanders and personnel officers which lasted beyond the active 1943 campaign.

Sometimes difficult and even impossible to distinguish from classification work in the Army is the work of Personnel Consultants. In the AAF as well as in other parts of the Army, Classification Officers are often also qualified and classified as Personnel Consultants. The latter job title is described in Army



manuals as more purely psychological than is the job of Classification Officer. Since the authorized rank on Tables of Organization is customarily higher for Classification Officers than for Personnel Consultants, efficient consultants have sometimes been upgraded into the more administrative position. A large share of personnel consulting in the Army has dealt with "problem children" of low ability, low education, or inadequate personality. The AAF due to its high percentage of highly skilled technical jobs has received a minimum of these persons possessing low ability and education. There have been some who needed clinical advice, and where possessing latent ability, needed training. AAF Personnel Consultants who have done this job include Obermann, H. M. Skeels, McCann, McNeill, Switzer, and Snee.

One of the prime points mentioned in the 1943 AAF campaign to minimize malassignment was the introduction of the Personnel Classification Audit. This was used to bring about the salvage of approximately 50,000 highly trained specialists in the United States. Their qualifications had been lost in the explosive growth of the AAF, but when they were rediscovered they were promptly reassigned. Even in several active combat theaters overseas, the Personnel Classification Audit has proved effective in finding and using badly needed technicians. In one theater it has been extended to accumulate basic data concerning the actual military occupational specialty needs of units.\*

In conclusion there has been a considerable amount of research and application of aviation psychology in the Army Air Forces independent of the program sponsored by the Air Surgeon. Specifically, studies have been made of methods for improving the selection of airplane mechanics and other aviation ground technicians; job analyses, job families and job descriptions in terms of an effective occupational structure; selection and training of bombardiers and navigators; educational examination of prospective pilots; aptitude tests for civilian technicians; Army General Classification Test grades for military and civilian occupations; attitudes towards job assignment of enlisted men; and classification and duty assignment procedures including the Personnel Classification Audit.

\* The author has published on a few of the subjects discussed above and has worked on some of the other subjects. It is not possible at this time and place to give a list of references.



# A BIBLIOGRAPHY OF NAVAL CLINICAL PSYCHOLOGY\*

IRIS STEVENSON, LT. (J.G.) H(W) USNR

For four years clinical psychology has been functioning as an integral part of the neuropsychiatric program of the Bureau of Medicine and Surgery in the Navy Department. Psychologists have been assigned to training station selection units, naval hospitals, precommissioning ships, receiving ships, embarkation centers, disciplinary activities, and the various retraining programs. Many publications have issued from these Naval activities which are of interest both to civilian psychologists in like activities and to those with an historical interest in the development of psychology in the military services. Since many of these articles have been published in journals not familiar to psychologists, it seems appropriate to gather them together in a convenient, accessible bibliography.

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\* The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.



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# CLINICAL PSYCHOLOGY IN THE ARMY: A BIBLIOGRAPHY

C. H. PATTERSON, 2ND LT., AGD

The Army has only recently been utilizing clinical psychologists as such. In 1943, six psychologists were commissioned in the Sanitary Corps, Medical Department, for service in General Hospitals (24). At present clinical psychologists are being commissioned in the Adjutant General's Department for similar duty (43). This program is too recent to have resulted in any published reports of experience or research, though undoubtedly such will soon be forthcoming.

However, psychologists have in many instances been performing duties of a clinical nature, and several reports of this work have appeared. A number of them are concerned with the Army Special Training Units (1, 3, 31, 42), or with the Army Specialized Training Program (20, 26, 28).

In the Army, psychiatrists have made many contributions to fields which are of interest to clinical psychology, particularly the field of mental hygiene. Therefore, a number of reports in this area, though written by psychiatrists, have been included in the following bibliography (5, 6, 7, 11, 12, 13, among others).

The following list brings together published reports of clinical psychology in the Army. For security and other reasons, much material remains as yet unpublished. Thus, a complete list, even of the work accomplished to date, may not be available until some time after the duration.

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## POST-WAR PSYCHOLOGICAL SERVICES IN THE ARMED FORCES

Two conferences of military psychologists were called by Dr. Robert M. Yerkes at the National Research Council on July 12 and October 31, 1944 to discuss questions concerning psychological work in the post-war military organization. As a result of the deliberations certain recommendations were formulated and agreed upon. Copies of the recommendations were transmitted to the Secretary of War and the Secretary of the Navy with the following letter.

The Honorable

The Secretary of War (Navy)  
Washington, D. C.

18 December 1944

Dear Mr. Stimson: (Mr. Forrestal)

I have been authorized by my colleagues to present to you and to the Secretary of the Navy (War) the accompanying report and recommendations relative to provisions for psychological work in the post-war military structure.

The report resulted from the deliberations of two Conferences of Military Psychologists held in Washington 15 July and 31 October, 1944. It was prepared for the Conference group by a special Committee on Report which consisted of Dr. Donald G. Marquis, Chairman, Dr. Walter V. Bingham, Colonel John C. Flanagan, Commander John G. Jenkins, and Dr. Walter S. Hunter.

This document is the product of extensive experience in Military Psychology, dating from 1917 to 1944, and of careful study of the prospective needs of our Armed Services for the development of Human Engineering. It is committed to you in the hope that it may prove useful to your Department in the designing of post-war military structure.

As you very well know, Sir, during World War I our military leaders discovered that specialists in Psychology and other personnel procedures could greatly increase our military might. Military Psychology came to be recognized as a division of Human Engineering, but between wars this novel discovery was forgotten. No provision was made for the development of new methods, their application and evaluation. Consequently, when in 1941 we found ourselves in desperate need of all possible aid in the use of manpower, we were at serious disadvantage by comparison with our enemies. Nevertheless, in the current war the primacy of Human Engineering has been demonstrated and in our military establishments it now is generally recognized that the value of the machine in war, as in peace, depends chiefly on the quality, training and placement of the men who design, use and maintain it. This report is based on the assumption that we, as a people, have now learned the importance of preparedness and will not again risk our existence by freezing our assets between wars.

Respectfully submitted,

Robert M. Yerkes

Chairman of the Conference

Letters received from the War and Navy Department indicate that the recommendations are receiving serious consideration in the highest echelons of both services. Representatives of both services indicate that discussions of the proposal are continuing, especially with reference to the first two recommendations.

### RECOMMENDATIONS CONCERNING POST-WAR PSYCHOLOGICAL SERVICES IN THE ARMED FORCES

*Nature of Psychological Services.* A major task of professional psychologists in the Armed Services is research on the human factor in connection with the following problems: (1) analysis of military tasks and occupations; (2) development of tests and procedures for selection, classification and distribution of



personnel; (3) development of training programs and of methods for evaluating training; (4) design and testing of instrumentalities of warfare (weapons, vehicles, airplane controls, radar, etc.) from the standpoint of the capacities of the personnel using them; (5) development of clinical techniques and procedures for individual examination and consultation services; (6) study of psychophysiological factors such as vision, hearing, and fatigue in the performance of specialized military tasks; (7) development of dependable techniques for ascertaining attitudes or opinions and procedures for use in orientation programs, in morale services, and in psychological warfare.

Military psychologists have also been called upon to supervise the administration of practical programs arising from the results of their research investigations. Routine duties of group-test administration and scoring, interviewing, classification, and assignment are carried out by commissioned and noncommissioned personnel receiving the necessary special training in service schools in which psychologists participate as instructors.

During the present war more than one thousand psychologists have been utilized in specialized work in the Army and Navy (including Air Forces, Marines, Coast Guard, Maritime Service and Office of Strategic Services), and some 300 more have served in civilian status in the War and Navy Departments and in the work of the Office of Scientific Research and Development. The shortage of trained psychologists led the Army to provide for the training of 1,300 enlisted men in Advanced Personnel Psychology in the Army Specialized Training Program. At the present time the demand for qualified psychologists in the Army is far in excess of the supply.

*Special Problems of the Post-War Period.* The nature of modern warfare renders it imperative that research on military service problems be maintained at a high level of efficiency following the present war. The requirements for achievement of this goal are essentially similar for psychological research and for other sciences and branches of engineering. Research scientists of good ability are not likely to choose a career in the Armed Services unless their professional status is definite and clearly indicated, and opportunity for continued research is adequately assured. Recent surveys indicate that few professional psychologists now in the Armed Forces desire and plan to remain in service after the war. The continuation of an agency such as the Office of Scientific Research and Development to administer research by civilians in university and industrial laboratories could best fulfill the needs of the military services if professional scientists who are members of the Armed Forces can provide direct knowledge of military requirements and effective liaison for the testing and application of research findings.

*Recommendations.* In view of the considerations outlined above, it is recommended:

1. That a research and development corps be established in the Services with commissioned personnel consisting only of qualified scientists.

2. That provision be made in this research and development corps for psychologist officers. Such specialists should be clearly designated as psychologists in order that problems and proposals within their field of competence will be brought to their attention.

3. That psychologist officers in the research and development corps be available for assignment to duties in the various subdivisions of the Armed Forces for such periods as needed, not only for research and consultation but also for administration of practical programs.

These recommendations are intended to secure the following advantages, among others, for the Armed Forces:



1. To help assure that highly qualified psychologists will enter and remain in military service by making available to them both military and professional status, association with scientific colleagues, and assured opportunities for a continuing career in psychological research and development.

2. To provide for the coordination of psychological research in the various subdivisions of the Armed Forces in which such research and the practical applications of its findings are required; and at the same time to permit intimate study of the special problems of the several subdivisions of the Armed Forces through assignment of research personnel to detached duty in those subdivisions.

3. To provide an effective agency for the promotion and direction of research by psychologists in the reserve corps and in civilian status. The military psychologist should be enabled and required to maintain continuous and close relations with developments in professional psychology in order that he may know the qualified personnel available in the reserve corps and in civilian status; in order also that he shall be in a position to promote and coordinate research on military problems by civilian agencies and personnel; and finally in order that he may so maintain his status and reputation in the profession that he may effectively use civilian experts as consultants and advisors.

In these ways it is believed that the profession of psychology will be able to make its greatest contribution to preparedness and security.

*Members of the Conference of Military Psychology*

- DR. WALTER V. BINGHAM, Chief Psychologist, Classification and Replacement Branch, Adjutant General's Office
- DR. CHARLES W. BRAY, Technical Aide, Applied Psychology Panel, National Defense Research Committee
- LT. STEUART HENDERSON BRITT, Hqs. Comdr. in Chief U. S. Fleet, Navy Department
- DR. LEONARD CARMICHAEL, Chairman, Division of Anthropology and Psychology, National Research Council
- LT. RAY N. FAULKNER, Officer-in-Charge, Tests and Research Unit, Standards and Curriculum Division, Bureau of Naval Personnel
- DR. SAMUEL W. FERNBERGER, Technical Aide, Division 7.4, NDRC
- COL. JOHN C. FLANAGAN, Chief, Psychological Branch, Office of the Air Surgeon
- DR. CARL I. HOVLAND, Director of Experimental Studies, Information and Education Branch, Morale Services Division, War Department
- LT. COMDR. WILLIAM A. HUNT, Chief Psychologist, Neuropsychiatry Branch, Bureau of Medicine and Surgery
- DR. WALTER S. HUNTER, Chief, Applied Psychology Panel, NDRC
- COMDR. JOHN G. JENKINS, Chief, Psychology Section, Aviation Medicine, Bureau of Medicine and Surgery
- COMDR. C. M. LOUITT, Commanding Officer of Service Schools, Naval Training School, Bainbridge
- DR. DONALD G. MARQUIS, Executive Secretary, Army-Navy-OSRD Vision Committee
- LT. COL. LOUIS L. MCQUITY, Senior Auditor, Northeastern War Department Personnel Audit Team, AGO
- DR. WALTER R. MILES, Vice-Chairman, Committee on Aviation Medicine, NRC
- LT. COL. MARION W. RICHARDSON, Chief, Personnel Research, AGO
- LT. COL. MORTON A. SEIDENFELD, Chief Clinical Psychologist, AGO
- LT. COL. LAURANCE F. SHAFFER, Chief, Psychological Division, AAF Personnel Distribution Command
- MR. JOHN M. STALNAKER, Associate Secretary, College Entrance Examination Board
- DR. DAEL WOLFLE, Technical Aide, Applied Psychology Panel, NDRC
- DR. ROBERT M. YERKES, Yale University.



## PSYCHOLOGY AND THE WAR: NOTES

*Aviation Psychology* "The RAF paid the AAF a compliment in 1944 by adopting our system of air-crew selection and classification. Our psychological testing procedures were also adopted by the Free French.

The battery of 20 psychological tests used for classifying all candidates for pilot, navigator, bombardier, and aerial gunnery training have proved valid in predicting not only an aviation cadet's chance for winning his wings but also the flier's chance for combat success. In a follow-up study of both bomber and fighter pilots in the European theater, it was determined that pilots who had scored highest in the psychological tests administered before they learned to fly tended to be rated by the squadron commanders as most successful in combat. Likewise, those who had the minimum acceptable scores appeared to be most frequently "missing in action."

The Aviation Psychology program in the past year has been extended to a point where it contributes to the number of bombs which hit within the target areas. It has been observed that bombing accuracy, as far as the human element is concerned, depends largely upon the ability of the navigator to set a course to the target area and upon the ability of the bombardier to identify the target and direct his bombs to it. The practice of using Pathfinder airplanes to mark a target and of the units of a formation to drop their bombs on a signal from the lead airplane places a premium on the proficiency of the lead navigator and the lead bombardier.

To aid the commanding officers of heavy bombardment groups in selecting the men best qualified for these key positions, psychological aptitude and proficiency tests have been adopted and are now routine in the European theater. A detachment of aviation psychologists studied bomb strike photographs in a 3-months' series of missions against Germany and found a definite correlation between the accuracy of lead bombardiers and the original aptitude test scores they had received a year or more before, when they were untrained. The Aviation Psychology program was paid off in time, lives and money saved, and through its selection of the raw material has aided in the establishment of an effective combat air force. This has been done at a total cost of less than \$5.00 per candidate tested." Excerpt from the Second Report of the Commanding General of the Army Air Forces to the Secretary of War, Feb. 27, 1945:

*Committee on the Relocation of Military Psychologists.* The Military Section of the American Association for Applied Psychology has appointed a Committee on the Relocation of Military Psychologists. Among the primary functions of the Committee will be: (1) obtaining information regarding opportunities for employment, refresher training, research, scholarships, and graduate facilities available for returning servicemen; (2) supplying these types of information to all qualified psychologists in the armed forces, and also to those men and women in service who are in the process of becoming psychologists; (3) active cooperation with the Office of Psychological Personnel with reference to the relocation of military psychologists. The members of the Committee are: Captain HUGH M. BELL, AUS (Adjutant General's Office); Colonel JOHN C. FLANAGAN, AUS (Office of the Air Surgeon); Lieut. (j.g.) JOHN G. DARLEY, USNR (Bureau of Medicine and Surgery); and Lieut. STEUART HENDERSON BRITT, USNR (Headquarters, Commander in Chief, U. S. Fleet), as *Chairman*. Correspondence should be addressed to the Committee, c/o Office of Psychological Personnel, 2101 Constitution Ave. N.W., Washington, D.C.



*OSRD Project on Rehabilitation at Stanford.* A project for research on the "Social Psychological Rehabilitation of the Physically Handicapped" is the subject of a contract between Stanford University and the Office of Scientific Research and Development, recommended by the Committee on Medical Research. On the research staff of the project are: TAMARA DEMBO (Research Director), HELEN H. JENNINGS (Research Associate in Psychology), RALPH K. WHITE (Assistant Director), and MILTON ROSE (Psychiatrist). The Advisory Board, headed by the Chairman of the Department of Psychology, ERNEST R. HILGARD, includes members of the Department of Psychology and School of Medicine: ROGER G. BARKER, PAUL R. FARNSWORTH, GEORGE S. JOHNSON, DONALD E. KING, QUINN MCNEMAR, and CALVIN P. STONE. The project has as its aim the investigation of stigmatizing attitudes toward physical handicaps, through investigation of different degrees of maladjustment as shown in the inter-personal behavior between physically handicapped and non-handicapped, people. While emphasis is placed upon the problems of the war-handicapped the study includes those handicapped in civilian life. The study includes diverse interview and discussion techniques, group experiments, role playing, level of aspiration, value structure and value-analysis methods.



## BOOK REVIEWS

ABRAHAMSEN, DAVID. *Crime and the Human Mind*. New York: Columbia University Press, 1944. Pp. xi+222.

"The first volume to deal comprehensively with the psychiatric aspects of crime, *Crime and the Human Mind* presents a revolutionary approach to the problem." These are the presumptuous but thoroughly unwarranted claims made for Dr. Abrahamson's book in the publisher's blurb. More realistic is the goal set for himself by the author: to help dispel some confusion and to orient readers in the psychiatric-psychologic concept by writing a single book which will contain information now obtainable only in a number of unrelated volumes. The author in order to satisfy these purposes includes a comprehensive historical review of the meaning of as well as society's reaction to criminal behavior through the ages, a well-considered outline for examining the offender, a fairly detailed description of the author's preferred system of classification, and a consideration of constitutional and motivational factors in crime. Also included in separate chapters are a consideration of war and delinquency, the background of murder, and treatment of the offender. The emphasis in the book is on personality factors in the sense of forces which drive an individual to crime.

The author's background in both Norway and the United States for the consideration of this particular problem is seemingly rich and varied. In his listing of psychological tests included in his examination of the offender, his emphasis in the selection as well as consideration of the tests is on personality factors rather than the IQ. Standardized intelligence tests he lists are the Bellevue Adult, Merrill-Terman, and Babcock tests. The only other set of tests he lists are projective personality tests: Rorschach, Szondi, and Thematic Apperception tests. He also refers to the cruelty-compassion test of Hawthorne. In his consideration of constitutional factors he shows a deep appreciation of Lombroso's contribution and a familiarity with Hooton's work, of which he is realistically critical; but for some reason he completely omits Sheldon's more recent work on physique and temperament. His system of classification may serve his purposes well, but it is probable that individuals with different background of experience would choose classifications of their own making that are more in line with their own approaches. In his consideration of motivation in murder his emphasis is on self-destruction, and seemingly the individual genesis and development, continuity and discontinuity, in a single life story are temporarily forgotten. The road to self-destruction is the one emphasized. In spite of his training with Malinowski and his realization that disunity and conflict in family rather than broken homes contribute towards criminal behavior, he uncritically accepts the Oedipus complex in his consideration of relationship of family attachments to behavior. Again, in spite of his realization that social factors and anthropological knowledge have to be considered in understanding crime, the author uncritically accepts Jung's concept of racial or collective-unconscious. In his evaluations of heredity and environment the attitude and conclusions are in line with modern investigations, to many of which no reference is made.

Though not revolutionary nor very comprehensive, this book does represent a handy first volume for orienting a worker in the field of criminal behavior. Particularly can it serve as a background, in the light of which more recent volumes emphasizing in some greater detail other works and other approaches can be more clearly understood.

H. MELTZER.

*Psychological Service Center, St. Louis, Missouri.*



HOLLINGWORTH, H. L. *Leta Stetter Hollingworth*. Lincoln: University of Nebraska Press, 1943. Pp. 204.

Leta Stetter was born in a "soddy" near Chadron, Nebraska. Later she lived in a log cabin and attended a rural one-room school. Her pioneer forebears included as varied personalities as a preacher-farmer grandfather who fought a courageous but losing battle against poor land and the elements and an irresponsible cowboy-minstrel father who never reached maturity though he lived to be very old.

Early childhood was spent on the grandfather's farm; adolescence less happily in the home of her father and step-mother at Valentine. This home was referred to by Leta in her letters as the "fiery furnace." Deliverance came when she graduated from high school at sixteen and entered the University of Nebraska. There she majored in English Literature and obtained a B.A. degree and a Teacher's Certificate. After teaching in the high schools at DeWitt and McCook for one year each, she went East to marry Harry L. Hollingworth.

Though a great deal of her time was devoted to household task during the early years of her marriage, she managed to earn M.A. and Ph.D. degrees from Columbia University, and then became an instructor on the staff of Teachers' College. She was a full professor in the same institution at the time of her death. In 1938 she and her husband returned to their alma mater to receive Doctors of Laws degrees. She died in 1939 after a brief illness.

H. L. Hollingworth has written a simple, sincere, but guarded biography of his wife. In an effort to be as objective as possible, he has depended largely upon records and letters for his material, and has reproduced many of her poems. This reviewer would have preferred less of the purely objective material and more of the biographer's own impressions of her personality, interests, and professional achievements. It is of course natural that he should refrain from elaborating upon their married life. Unfortunately, however, from the point of view of the reader interested in tracing the development of Mrs. Hollingworth's personality to maturity, this leaves a great gap. There are other gaps in the chronicle also: some because information was lacking and others where information was deliberately withheld in order to save living relatives and friends possible embarrassment.

Of special interest to the psychologist is the diary kept by Leta's mother describing her first year of life. The work of a keen observer, it includes a careful record of a number of behavioral sequences indicative of precocious development.

The biography provides an explanation of Leta Hollingworth's championship of suitable education for gifted children. She was herself a typical gifted child. At ten she put away childish things in order to become "competitive." She early showed a love for verbal expression and from adolescence until her death she wrote continuously—stories, poems, and letters as well as scientific articles and books. It appears from the quality of her poems that it is largely circumstantial that we know her as a scientist and an educator rather than as a literary figure. She is portrayed as a person of great vitality, many interests, and a sensitivity to beauty truly remarkable against the bleakness of her early environment.

Those who knew Leta Hollingworth and her work will enjoy this biography, though at times they will be irritated by long passages of very brief quotations from her letters with little connecting exposition. Many fine pictures of her at successive ages are an especially valuable part of the book. A complete list of publications has been appended.



REIK, THEODOR. *The psychologist looks at love*. New York: Farrar and Rinehart, 1944. Pp. xviii + 300.

Poets have gazed; philosophers and some psychologists have glanced, and sometimes penetrated, the psychology of love by presenting collected intuitions, scattered hunches or striking case histories. Reik has applied a systematic set of basic psychodynamic concepts within a consistent theoretical framework. Notwithstanding his surface attacks on the body of *Psychoanalysis*, he has extended its frontiers into normal adulthood by his profound insight into various normal love phenomena, particularly romantic love. He makes penetrating forays into the problems of parent-child relationships, friendship, general attitudes toward society, and of certain religious and artistic experiences.

Reik develops and refines two propositions (112): 1) "Love is not originated in the sexual urge but belongs to the realm of the ego-drives." 2) "Love is in its essential nature an emotional reaction-formation to envy, possessiveness, and hostility." Differentiating sharply between biological sexuality and psychic loving, he abandons the problem of their interrelationships and proceeds with the unconscious strivings of the discontented ego. The growth of the ego-model (particularly in adolescence) into relatively impersonal ego-ideals may result in a painful self-dissatisfaction which is preparatory to an active, unconscious search. The love-object chosen must possess an appreciable quota of those tendencies and qualities sought. Then envy and hostile competition must be overcome; the dramatic conflicts begin, both within and between the two, with the dynamics reaching deep into the early layers of the ego, and subject to the errors and illusions characteristic of primary processes. Various types of love relationship may develop, interactions of the variable and contradictory unconscious ego drives involved. Successful relating is seen in a relief of previous dissatisfaction and hostility through an ego expansion, a very primary psychic identification and absorption of one another. Failure may occur at any stage in the blossoming; Reik makes acute diagnoses of basic failure types. The inevitable fading of intensely romantic love is also analyzed. "Transformation" may occur to a more peaceful sharing, more rewarding to a mature ego. Reik concludes with a rich discussion of the basic hate-love reaction-formation process in related social, religious, and aesthetic phenomena.

The genetic core of love (and achievement, an alternative ego-completion) is located in the child's drive for and insecurity in mother affection; "Love begins as an unconscious fantasy of being loved" (181). Reik proposes that "women in general are more insecure than men" (173), yet he fails to relate this to the relevant body of precise genetic data and hypotheses on differential parental handling, on sexual (dis)pleasure experiences, and personality patterning residues from the fourth year on. Consequently, infant narcissism is misinterpreted and adult sexuality is left as a purely biological drive.

It is interesting to compare Reik's thesis with another psychoanalytic development, Wilhelm Reich's (*Function of the Orgasm*). Both attack Freud's libido theory, yet with quite contrary objections. Reich declares that Freud abandoned his original insights into the basic significance of complete physiological, sexual release. Reik insists that Freud continued to approach love as "aim-inhibited sex" and to imply that "love and sex . . . are of the same stuff" (23). Neither discusses adequately the effects of loving upon sexuality, or vice versa; Freud saw the complexities and worked cautiously (9-11). Yet Reik insists upon a strict separation of sex and love (23), ignores the deep polarity character (Jung) of a man-woman love relationship, and neglects the various genetic levels differentiating dominance-submission roles for male and female behavior; e.g. nothing on the "brave deserve the fair" formula. Such procedure violates



a fundamental methodological premise basic to a complete psychoanalytic formulation: the principle of multiple-determinism. Also, no anthropological or aesthetic or martial considerations of love are given. Reik admits to gaps and promises a next work on love-sex interrelations.

It is, however, no small contribution to systematize the psychodynamics of ego mechanisms in adult love-relating. Dr. Reik has written a brilliant analysis. Frequent, delightful excursions into roughly equivalent popular terminology and a degree of lyrical redundancy will probably assist the non-academic and, perhaps, the non-analytic reader.

JOEL SHOR.

*New School for Social Research.*

YOUNG, K. *Social psychology* (2nd Ed.). New York: F. S. Crofts, 1944. Pp. viii + 578.

In the revision of a text, it is customary to introduce new material to supplement that presented in the original, to add one or more new chapters, and to shift the order of presentation. This Young has done in his second edition of *Social Psychology* which was first published fifteen years ago. In most respects, this has improved the book, though it is to be regretted that this policy was not carried further in some sections.

The book is divided into three parts. *Part one*, nearly one half of the entire book, presents a discussion of personality and some of its basic relations to society and culture. In view of the present trends in psychological investigation, this emphasis seems justified, though the space given to a discussion of learning, drives and emotions, and the foundations and mechanisms of personality repeats much of what the student has already covered in general psychology, presumably a prerequisite for social psychology.

To show that social behavior is not limited to humans, Young introduces a chapter on social life in different animal species. This is an innovation, so far as the usual pattern of social psychology texts is concerned, and should prove to be an interesting introduction to the subject of social behavior. With the vast amount of scientific information available today regarding the social behavior of children of all ages, it is to be regretted that Young did not continue this genetic approach and show how adult social behavior is the direct outgrowth of the socialization that takes place during the developmental years.

The influence of social and cultural factors on personality development is treated from the point of view of primitive as well as contemporary social groups. Examples from selected tribes of native peoples, and from contemporary society are used to illustrate the interplay of culture and personality. This information is given in tabular form which, while a concise method of presenting a mass of material, makes tedious reading and to a certain extent leaves interpretation of the facts presented to the reader who may or may not realize the true significance of these forces on the personality development of the peoples.

*Part two* which is limited to an analysis of *Some Aspects of Social Conflict* includes chapters on prejudice, revolution, war, civilian morale and other problems of morale. Young prefaces this section by stating that "conflict presents the most serious and persistent problems in group relations." He then devotes two chapters to a discussion of racial, industrial, political, religious and other kinds of prejudice, and three to a consideration of revolutions and wars as the most violent and engrossing human struggles for power.



Because of its timeliness this section is extremely important. The only criticism to be offered is that it is too short. While fewer experimental studies are quoted to illustrate the points discussed than in part one, examples from newspaper reports, magazines, other textbooks and discussions by specialists in their respective fields not only add interest to these chapters, but also serve to drive home the points the author is stressing.

*Part three*, devoted to the *Mass Behavior* of crowds and of publics, analyzes and describes the thought and conduct of individuals under mob conditions. Forms of mass behavior, the nature of the leader and of the audience, fashion, public opinion, the media of public opinion formation, propaganda, psychological warfare, and finally control and power, are the main topics discussed. The chapters on opinion and its formation are especially significant and timely. The analysis of opinion polls and the roles played by the radio, motion pictures and the newspapers in opinion formation have a close bearing on American life today. The chapter on *Fashion* seems a trifle superficial though, it is true, scientific research in this field has been somewhat scanty.

Footnote references throughout the chapters, more comprehensive references as suggested readings given at the end of each chapter, a glossary of technical terms and non-technical ones carried over from common usage into social psychology, and a brief summary of the highlights of each of the three sections, preceding the chapters of these sections, serve to make the text a very readable one. Teachers and students of social psychology may feel confident that they are given a summary of the most recent scientific information in this field between the covers of this book and that as a text, it will serve its purpose adequately.

ELIZABETH B. HURLOCK.

*Columbia University.*



## NOTES AND NEWS

EDMUND BURKE DELABARRE, professor emeritus of psychology at Brown University, died March 16, at his home in Providence, R.I. He was 81 years old. Dr. Delabarre studied at Brown, Amherst, Berlin, Harvard (A.M., 1889), Freiburg (Ph.D., 1891), and the Sorbonne. He came to Brown in 1892, where he established one of the first ten psychological laboratories in America. Forty years later he retired from teaching, but continued to come to the laboratory daily until he was incapacitated by heart trouble two years ago. His primary research was in the field of kinaesthesia, but he also devoted considerable attention to the deciphering of inscribed rocks in New England.

The Reverend JOHN EDWARD RAUTH, O.S.B., associate professor of psychology, the Catholic University of America (Washington, D.C.), died, March 5, at the age of fifty-nine years. Father Rauth had served as instructor in chemistry (1913-17, 1919-21), Mount St. Mary's College (Emmitsburgh, Md.), and instructor in psychology (1922-34) and assistant professor (since 1934), the Catholic University of America. He had also held an instructorship in Trinity College since 1930.

At the meeting of the Society of Experimental Psychologists held in New York City on April 5, 1945, the Howard Crosby Warren Medal for outstanding work in experimental psychology was awarded to CLARK L. HULL, of Yale University, "for his careful development of a synthetic theory of behavior. This theory has stimulated much research and it has been developed in a precise and quantitative form so as to permit predictions which can be tested empirically. The theory thus contains within itself the seeds of its own ultimate verification or of its possible final disproof. A truly unique achievement in the history of psychology to date."

On March 21st in Wilmington, Del., a testimonial dinner was held for J. E. W. WALLIN, who retires this year as director of the division of special education and mental hygiene, Delaware State Department of Public Instruction. A book of 117 testimonial letters from friends and professional colleagues in twenty-four states was presented to Dr. Wallin. The inscription on the cover page was "To J. E. Wallace Wallin, Psychologist, Educator, Humanitarian, in Appreciation of a Life of Service," and an unusual illuminated title page from the brush of MARTIN JENNINGS bore the inscription "To J. E. Wallace Wallin, in Appreciation for a Life Well Spent in the Service of Handicapped and Mal-adjusted Members of Society." CHARLES E. SKINNER was chairman of the meeting. The presentation was made by LLOYD E. YEPSEN.

DONALD G. MARQUIS, of Yale University, has been appointed chairman of the University of Michigan Department of Psychology, effective September, 1945, to fill the vacancy left by the retirement of WALTER B. PILLSBURY in June, 1942. Dr. Marquis who has taught at Yale since 1933 has recently been executive director of the Office of Psychological Personnel of the National Research Council.

VICTOR R. NOLL, who has been serving as assistant to the commanding officer of the Navy V-12 unit at the University of Illinois, was reinstated as professor of education, effective June 1, at the Michigan State College of Agriculture and Applied Science (East Lansing).

JOHN M. STALNAKER, former professor of psychology, Princeton University, who has been serving as general director of the Army-Navy College Testing Program, has been appointed dean of students, Stanford University. Dr. Stalnaker will assume his duties in September, when the new office, created to



"co-ordinate the present functions of the registrar, the dean of men, and the dean of women," will be put into operation.

LOREN S. HADLEY, assistant professor of psychology, the Ohio State University, will assume the directorship of the Bucknell University Testing Bureau, July 1. Dr. Hadley will also be a teaching member of the staff with the rank of assistant professor.

E. Y. HARTSHORNE, who has been on leave from Harvard University since September, 1941, with the Office of Strategic Services, the Office of War Information, paid a brief visit to the Harvard department of psychology while on leave recently from the European Theater of Operations. Since going overseas in September, 1943, with the Psychological Warfare Branch, he has been in North Africa and Italy. He is now with the SHAEF.

AUSTIN B. WOOD, director, announces a change of name of the Office of War Service Counseling at Brooklyn College to the Veterans' and War Counseling Office, in keeping with the newly developed duties of that office.

STEPHEN M. COREY, professor of educational psychology, the University of Chicago, was appointed director of the university's audio-visual-instruction center, March 28. The center, which was formally opened on March 31, was established "to meet the increased utilization of schools of sound-films and other audio-visual media and will function in collaboration with the department of education and the university's laboratory schools." It will also make use of Britannica Films, formerly Erpi Classroom Films.

The 63rd General Assembly of Illinois passed a law providing for the education of educable mentally handicapped children, which was sponsored by the Illinois Association for Applied Psychology. The law provides that qualified psychological examiners shall determine which children are eligible for special classes or services. A qualified psychological examiner is defined as "a person who has graduated with a Master's or higher degree in psychology or educational psychology from a higher institution of learning which maintains equipment, course of study and standards of scholarships approved by the Superintendent of Public Instruction, who has had at least one year of full-time supervised experience in the individual examination of children, of a character approved by the Superintendent of Public Instruction, and who has such additional qualifications as may be required by the Superintendent of Public Instruction." A special committee has been appointed by the Superintendent of Public Instruction to assist him in judging whether credentials submitted meet the requirements laid down by law. The members of this committee are: FRANCES A. MULLEN, AGNES SHARP, HELEN SHACTER, IRENE C. SHERMAN, and ANDREW W. BROWN, *chairman*. To date 112 psychologists have made application to become qualified psychological examiners and 60 who have met the qualifications set forth in the act have been duly certified by the Superintendent of Public Instruction.

*Internships, New Hampshire State Hospital.* The department of psychology of the New Hampshire State Hospital and its affiliated Mental Hygiene and Child-Guidance Clinics offers two annual internships for the year beginning September, 1945. A Bachelor's degree from an accredited university and a major in psychology are the minimum requirements. Persons with some graduate work are preferred. Candidates will be given opportunities to obtain experience in clinical psychology (testing, interviewing, guidance procedures, etc.), research and teaching (school of nursing). Full maintenance plus a small monthly stipend are offered as remuneration. For further information write to DR. A. I. RABIN, *New Hampshire State Hospital, Concord, N. H.*



*Internships Worcester State Hospital.* Six 12-month internships will be available in the psychology department of the Worcester State Hospital, beginning September 1, 1945. These positions are open to students, male or female, who have majored in psychology, preference being given to those with graduate training and whose curriculum has included courses in abnormal psychology and psychometrics. The internship offers supervised instruction in the principles and practice of clinical psychometrics and in general psychopathology. Opportunity is offered to attend staff meetings and conferences, courses in psychiatry and related fields, and to participate in seminars on psychopathology and clinical psychometrics. The interne is also expected to carry a research project under supervision. There is no cash stipend but full maintenance consisting of room, board and laundry is provided. Letters of application and credentials (Appointment Bureau records, letters of recommendation, grade transcripts, etc.) should be addressed to DAVID SHAKOW, *Worcester State Hospital, Worcester 1, Mass.*

The National Research Council announces the receipt of a grant of \$335,000 from the Rockefeller Foundation for the establishment of a temporary, nationwide program of predoctoral fellowships for study in the natural sciences. The fellowships are designed to encourage resumption of graduate study by young men who had to interrupt their education to engage in war work by enabling them to devote essentially full time to the completion of their work for the doctor's degree. Plans for the administration of the fellowships and methods for the selection of candidates are not yet worked out in detail, but it is intended that stipends will be fixed at rates to compare favorably with most other fellowships. The Council and the Foundation have developed this program to alleviate the very serious set-back to American scientific competence resulting from the war's interference with normal educational processes. In view of the uncertainty of the duration of the war, it is not expected that the program can be inaugurated immediately. The National Research Council will continue to administer its postdoctoral fellowship program, which has been such an outstanding factor in building up the scientific competence of the country, and which has thereby contributed essentially to the effort in meeting the present crisis.

A revised and enlarged bibliography on services for handicapped veterans, *Rehabilitation of the Disabled Serviceman*, is now available upon request from the Russell Sage Foundation, 105 East 22nd Street, New York 10, N. Y., at 20 cents per copy.

Rehabilitation personnel will be interested in reviewing the 19-page *Annual Report for 1944 of the Office of Vocational Rehabilitation*, Federal Security Agency. The report may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 10 cents per copy.

*Growth of the Psychological Corporation.* The Annual Report of the Psychological Corporation for 1944, issued in April, shows that the business has expanded from gross receipts of \$115 in 1922 and \$8,956 in 1931 to \$763,694 in 1944. The annual increase has varied from 10 per cent (1941) to 163 per cent (1933). The increase in 1943 was 62 per cent (from \$378,936 to \$611,504). There have been no deficits since 1934. Dividends have been paid in 1943 and 1944. Government contracts have constituted about one-fifth of the Corporation's business in the last two years, but the increases would still have been over 25 per cent in 1943 and 1944 without them. Psychologists can obtain a copy of the Annual Report by writing to the *Psychological Corporation*, 522 Fifth Avenue, New York 18, N. Y.



# Psychological Bulletin

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## NOTICE

CANCELLATION OF THE FIFTY-THIRD ANNUAL MEETING  
of the  
AMERICAN PSYCHOLOGICAL ASSOCIATION  
and  
PROVISIONS FOR A MEETING OF OFFICERS,  
Evanston, Ill., September 6, 1945

*To Associates and Members of the American Psychological Association:*

The regular Annual Meeting, tentatively scheduled for September, 1945, has been cancelled because of continued restrictions on travel necessitated by the war. Emergency legislation has been submitted to Associates and Members as provided by the By-Laws and the results are being tabulated at the present time. If the legislation is approved, the present Council of Directors and persons with official duties will meet with the new Board of Directors of the reorganized American Psychological Association to transact essential business. The meeting will begin on Thursday, September 6, at 9:00 A.M. in the Hardy Lounge of Scott Hall on the campus of Northwestern University in Evanston, Illinois, and will continue until all business has been completed. PROFESSOR WILLARD L. VALENTINE will be the local representative in charge of arrangements for the meeting.

The minimum number of persons needed for the transaction of essential business will be invited individually to attend the meeting in order to keep the attendance below the restrictions. If conditions at the time permit, invitations will be extended to newly elected Members of the New Council of Representatives.

Associates and Members are requested to correspond with the Secretary concerning any items that should be on the agenda for the meeting.

Cordially,

WILLARD C. OLSON, *Secretary*  
University of Michigan  
Ann Arbor, Michigan

June 18—1945



# THE USE OF THE WECHSLER-BELLEVUE SCALES WITH NORMAL AND ABNORMAL PERSONS

ALBERT I. RABIN

*New Hampshire State Hospital*

## INTRODUCTORY

For more than five years since its original publication, the Wechsler-Bellevue scale (30) has been gaining in popularity. Two new editions of Wechsler's book have since been published. The tests have become widely accepted in clinical practice and have become a popular instrument for research purposes, especially in the detection of scatter and patterns of functioning in various and sundry mental disorders. As a result, there has been a reaction against the use of scales not possessing tests of functional unity in the investigation of psychometric patterns. Brody, in his summary, states that "It is a pity that so much work has been done with 'hotch potch' scales, which make comparison difficult. Wechsler's scale is to be recommended (6, p. 140)."

Wechsler's scale consists of five verbal subtests *Information*, *Comprehension*, *Arithmetic*, *Digits* and *Similarities* and of five performance or non-verbal subtests *Picture Completion*, *Picture Arrangement*, *Object Assembly*, *Block Designs* and *Digit Symbol*. A sixth verbal test *Vocabulary* is frequently added to, or substituted for one of, the verbal subtests. It is a point scale, standardized on adults, it takes comparatively little time to administer and has the advantage of not being predominantly verbal in nature.

During recent years a considerable number of investigations employing the Wechsler-Bellevue scale have accumulated. The present review is an attempt to coordinate and summarize the findings to date and offer some suggestions for the future treatment of the data which is quickly and steadily mounting.

## COMPARISON WITH OTHER TESTS

Upon the publication of a new scale, there is a tendency to test its validity. This is usually done by comparing the results of the new test with those of some better known and traditionally more entrenched measures of intellect and, also, by a comparison of the test findings with clinical judgments and diagnoses, especially in connection with borderline intelligence and mental deficiency.

*Stanford-Binet, 1916 Revision.* Several investigators have compared the Wechsler-Bellevue findings with those of the 1916 Revision of the Stanford-Binet. Wechsler (30) reports a correlation of .82 in a group of 75 adolescents. Results of an unpublished study by Fishbein and reported by Wechsler (31) show a coefficient of .57 for 125 college freshmen. A correlation of .85 was obtained by Hayes (12) between the Wechsler-Bellevue scale and the Hayes-Binet, which is a special adaptation of the 1916 Stanford revision, especially for the use of the blind. Hayes' group consisted of adolescents (over 14) and adults. Since his subjects were blind, the verbal scale only was administered and the reported correlation is based on the results of that scale only. Thus, the correlations so far reported are about what is ordinarily expected in a comparison of different measures of intelligence.



*Stanford-Binet, Form L (1937)*. Additional and, probably, more extensive work has been done in comparing Wechsler's Scale with the 1937 Revision of the Stanford-Binet, Form L. Weider et al. (36) report a correlation of .81 in a population of 61 male delinquents. The verbal scale showed a considerably higher correlation ( $r$  .87) than did the performance scale ( $r$  .56). Though the mean IQs on both tests show only a difference of one point for the entire group, there are considerable discrepancies in individual cases. The general trend was in the direction of lower Wechsler-Bellevue IQs for the brighter subjects and somewhat higher IQs for the duller ones. Halpern's (11) Mental Hygiene Clinic patients showed a markedly higher correlation with the Revised Binet, Form L ( $r$  .91). Similar correlational levels were obtained by Benton (5) and Mitchell (18) using mental patients of a wide age range. Benton's results show a coefficient of correlation of .93 for 60 subjects, while Mitchell's 268 patients yield a correlation of .89. Both investigators found much higher degrees of correlation between the Binet, Form L and the verbal scale of the Wechsler-Bellevue, than with the performance scale. Benton obtained  $r$ 's of .92 and .78 for the verbal and performance scales respectively, while Mitchell's study show correlations of .91 and .80 for the corresponding scales. Anderson et al. (1) report a comparatively low correlation ( $r$  .62) for the two tests in 112 female college freshmen. These compare well with Fishbein's (31) findings quoted above. Here, again, the verbal IQs correlate much more highly ( $r$  .65) than do the performance IQs ( $r$  .39). The investigators, consequently, feel that such low correlations "... cast considerable doubt on the validity of the performance scale at the college level (1, p. 323)." Moreover, they pointed out that the Form L, IQs are on the average 10 points higher than the Wechsler-Bellevue IQs. This fact confirms, in part, Weider's (36) findings mentioned before. A high correlation (.89) between the verbal scale and the Form L was reported by Hayes (12) in the study mentioned above. Rabin (19) was interested in investigating the validity of the Form L Vocabulary and compared it with the Wechsler-Bellevue findings in 268 State Hospital inmates of a wide age range. He obtained an  $r$  .78 for the entire group. Some variations in the relationship in different diagnostic and age groups were also observed.

*Correlation with Other Tests.* Some data on the relationship between the Wechsler-Bellevue and other tests of intelligence and achievement are also available. In order to investigate the efficacy of the Kent-Emergency Test in diagnosis, Lewinski (14) validated it with a comparison with the verbal scale findings of the Wechsler-Bellevue. The examination of 290 "psychopathic and subnormal" naval recruits yielded a correlation of .727. He found that the majority tested higher on the Kent-Emergency. He also obtained a discrepancy of 10 or more IQ points in nearly 29% of his cases. Wechsler (31), in the third edition of his book, reports Rabin's correlation of his test with the Army Alpha, 5 to be .74 in 92 student nurses; the same source reports Fishbein's correlation with the Morgan Mental Ability Test, yielding an  $r$  of .62 in 125 college freshmen. Goldfarb (10) correlated the individual subtests of Wechsler's scale with the CAVD and the Otis SA. The corresponding mean  $r$ 's are .439 and .425 respectively, in 168 subjects of a wide age range. The total results of the Wechsler-Bellevue of this study were correlated by Lorge and reported by Wechsler, yielding considerably higher coefficients, ranging from .39 to .73. The male subjects showed consistently higher correlations with both tests—the CAVD and Otis. An  $r$  of .70 of the verbal scale with the Stanford Achievement Tests for blind subjects was also reported by Hayes (12). The results of Anderson's study (1) show correlations of .48 and .53 between the full Wechsler-Bellevue



Scale and the ACE. The verbal scale correlations are somewhat higher and are comparable to those obtained with the Stanford-Binet, Form L, while the performance scale correlations are almost negligible and apparently account for the lowering of full scale coefficients of correlation. The correlation with the year grade average yields similar results, justifying the final conclusion that "The correlation of the ACE tests, Revised Stanford-Binet Test and the Wechsler-Bellevue verbal scale with grade point averages are all approximately equal. (1, p. 325)."

*Clinical Status.* Several attempts to check the diagnostic effectiveness of the Wechsler-Bellevue Scales have been made. Balinsky et al. (4) have compared its effectiveness with that of the Stanford-Binet by correlating the test findings with the psychiatrist's recommendations for institutionalization or not, in two groups of retarded individuals, aged 10-22 and referred to the Bellevue Hospital. Actually a little over 100 cases serve as a basis for comparison. The findings show quite clearly higher correlations between recommendations and the Wechsler-Bellevue, Full Scale than between recommendations and the Stanford-Binet. While the correlations with the Full Scale for both groups are .720 and .785, the correlations of the recommendations with the Stanford-Binet are correspondingly .611 and .274. The relative effectiveness of the verbal and performance scales is not clear, since the results are equivocal and the high and low correlation coefficients are evenly divided between the two scales. A further extension of the study of the applicability of the Wechsler-Bellevue as a diagnostic tool was made by Wechsler and collaborators (34). Two groups of individuals, defective (IQs 50-65) and borderline (IQs 66-79) of a wide age range (10-49) were tested and a detailed analysis of the subtests made. "The differences between the mean scores on each of the ten tests obtained by the mental defective and borderline groups respectively, are all significant, except in case of Memory Span for Digits . . . ." They add further that " . . . all the verbal tests except the Memory Span for digits discriminate between the mental defectives and borderline groups (34, p. 557)." Lewinski's (14) findings with two similar groups of naval recruits show some comparable results, though the treatment of data is somewhat different. He feels, contrary to the previous investigators, that the Digit Span Test " . . . may be used advantageously in determining the possible existence of mental retardation in situations where rapid evaluation is essential (p. 544)." A dissenting voice comes as a result of Armstrong's (2) study; she feels that the 1916 Revision of the Stanford-Binet is a better diagnostic instrument, than either the Wechsler-Bellevue or Forms L and M of the new Revision, of mental deficiency, especially as differentiated from acquired mental defect or impairment of mental efficiency. This opinion is apparently based on clinical observation rather than experimental data.

*Resume.* It may be stated, therefore, that the majority of studies show high correlations between the Wechsler-Bellevue and other individual and group measures of intelligence. The highest Binet correlations are obtained in children and adolescents as well as in mental patients of a wide age range and greatly varying mental capacities. The correlations are much lower at the college level. This fact, however, is no reflection on the validity of the Wechsler-Bellevue; the fault may be with the Binet Scales, which are more adapted for children. Throughout the series of studies, the verbal scale correlates more highly with the traditional measures of intellect and achievement than does the performance scale. There is some evidence that the Wechsler-Bellevue IQs narrow the range of the distribution, i.e., higher IQs on other tests show lower Wechsler-Bellevue levels, while low borderline and defective level IQs show somewhat higher results



on the Wechsler-Bellevue test. The evidence, though not unanimous, favors the Wechsler-Bellevue scales as a differential diagnostic tool between borderline and outright mental deficiency, since it agrees to a higher degree than other mental measurements with clinical-psychiatric recommendations.

#### TEST RESULTS AND CHARACTERISTIC PATTERNS OF SPECIAL GROUPS

Intelligence testing has for some years entered a new phase of development. The psychologists are no longer satisfied with the diagnostic value of the *total score*, IQ or other quantitative results alone. Nor are they merely satisfied in diagnosing mental defect. They have developed a special interest in finding common factors in certain clinical groups that will distinguish them from others. Such distinguishing factors may give rise to the hope of shedding further light upon the psychological processes concomitant with various social, emotional and physical maladjustments. Moreover, psychologists have been called upon to devise some measures of mental impairment and deterioration. Consequently, the various studies of the *scatter* on the Binet scales have taken place. The assumption of those studies were that, ideally, in normalcy, the several abilities sampled by the ordinary intelligence tests show a similar, even and comparable level of development. The story, according to mounting evidence, is entirely different in various personality and behavior disorders. The various capacities constituting "general intelligence" seem to show an uneven trend, scatter or pattern because of the differential and selective effects of the particular disorder. The Wechsler-Bellevue, being a point scale, made up of eleven subtests of comparable weighted scores, lends itself, according to various investigators, much more easily to pattern analysis than do the several age-level or "hotch-potch" scales. The functional unity of each subtest affords a better opportunity for clear-cut, quantitative and statistical treatment.

*Alcoholism and Drug Addiction.* Twenty-nine chronic, non-psychotic alcoholics were studied by Wechsler (32). All had a history of at least 10 years drinking, but showed no organic brain involvement. The ages ranged from 36 to 55 years. The results of the Wechsler-Bellevue show comparatively high scores on Information and Comprehension (10 points each), but Digit Span, Similarities, Object Assembly and Block Designs contribute scores of only 7.2, 8.3, 7.8 and 6.8 respectively. When these results are compared with the normal standardization group of the same age levels, it is apparent that some inefficiency is present. Wechsler feels that the results "... indicate that prolonged use of alcohol impairs the mental functioning of various abilities even before there is any evidence of brain pathology (p. 485)." He also concludes that there is a positive relationship between the chronicity of the alcoholism and the severity of impairment.

The results of Brown and Partington (8), who tested a large sample of 371 drug addicts with the Wechsler-Bellevue, are mainly negative. They found no significant differences in subtest score patterns between samples of normal-non-addicted individuals and drug addicts. The samples were well-controlled for several factors. The IQ distribution curve is skewed to the left and there is some evidence of higher IQs in voluntary patients than in prisoners or probationers, resident at the U. S. Public Health Service Hospital in Lexington, Kentucky.

*Behavior Problems and Psychopathic Personality.* An incidental product of the investigation by Weider et al. (36) is the comparison of verbal and performance scale results for their group of 61 "problem children." While the Mean IQ on the full Wechsler-Bellevue is 87 for the group, the verbal and per-



formance IQs are 82 and 94 respectively, showing a mean discrepancy of 12 points, in favor of the performance scale. However, since this distinction is not the object of the study, the reliability of the differences is not reported. Wechsler (31), classifies young psychopaths in the group "scoring higher on performance tests," but does not offer anything more than empirical and clinical evidence to substantiate the statement. Levi's (13) doctoral study finally offers an adequate statistical justification for Wechsler's statements regarding psychopathic personality. Levi's experimental group of 45 adolescent male psychopaths were compared with 194 non-psychopaths and with Wechsler's standardization group of the same ages. The results indicate quite clearly that while the two control groups have mean verbal and performance IQs which are practically identical, the experimental group of young psychopaths shows mean IQs of 91.33 and 107.67 on the verbal and performance scales respectively, with a discrepancy of more than 16 points. The discrepancy is statistically significant (more than 999 in 1000). Another differentiating pattern offered by Levi is that "the sum of the scores on the Picture Arrangement and Object Assembly Test is higher than the sum of the scores on Picture Completion and Block Designs (p. 60)." However, only 47% of the experimental group and 9% of the control group have both patterns.

*Mental Deficiency.* The only other clinical group in which the performance IQ is higher than the verbal, according to Wechsler, are the mentally deficient. Apart from the clinical-empirical discussion in his book (31), Wechsler and his collaborators (34) found it to be true in their group of 198 defectives, whom they compared with a borderline group of the same age range (10-14). They admit, however, that only the younger group shows higher performance than verbal scores, but in the age group from 20-49, the verbal and performance scores are almost identical. It was, therefore, left unexplained whether the discrepancy is only a function of mental deficiency or a function of age as well. Magaret and Wright (17), in comparing 40 morons with 80 schizophrenics of the 30-39 age group, found a slight discrepancy, in the moron group, in favor of the performance scale. This discrepancy was not statistically significant, however. They also concluded that the morons show greater variability in the scores on the subtests as compared with normal controls. Finally, three differential diagnostic signs were suggested for distinguishing morosity from schizophrenia: comparatively poor arithmetic in feeble-mindedness and comparatively poor picture arrangement and comprehension in schizophrenia.

*Psychoses.* In contradistinction to the relationship of verbal and performance scales in the two clinical groups just discussed, are the psychoses which are, according to Wechsler (31) among the "clinical groups scoring higher on verbal tests." This does not hold true in all psychoses. Rabin's (20) work confirms the statement regarding the higher scoring on verbal tests in schizophrenia. The younger group shows an especially large mean discrepancy, while the discrepancy is lower for his total group of 78 schizophrenics of an age range from 16-49. Weider (35) showed a sizable discrepancy for a group of young (16-28) schizophrenics, but failed to find it in his older group (31-49). Magaret and Wright (17) found no such discrepancy in their group of 80 schizophrenics aged 30-39 years. It seems then, that the discrepancy in favor of the verbal scale is also a function of age. It is present in young schizophrenics and disappears in groups beyond 30 years of age. Brown et al. (7) show that the "most impressive differences" between the Verbal and Performance Scales (in favor of the former) are found in depressive patients. This difference (verbal minus performance) distinguishes significantly between depressives and psychoneurotics. A lesser



difference is noted in the comparison with psychotics. Manic depressive psychosis shows even a slight discrepancy in favor of the performance scale, according to Rabin's (21) findings. Thus, the results show that a discrepancy in favor of the verbal scale is frequently found in schizophrenia, though not without exception. There is insufficient data to make a generalization of this sort about the other psychoses.

Psychometric patterns of a more complex nature were investigated by Rabin (20) and Magaret (16), especially in schizophrenics. Rabin, from his study of the rank order of the subtests in several clinical groups and normal individuals and from empirical observation, arrived at a *schizophrenic index*, (consisting of the ratio of the sum of the weighted scores of Information, Comprehension and Block Design to the sum of the scores of, Digit Symbol, Object Assembly and Similarities) which distinguished reliably between schizophrenics, on the one hand, and normals, neurotics and psychopaths, on the other. A later study (21) also employs it in distinguishing schizophrenia from manic depressive psychosis. Magaret's (16) study of schizophrenics, paretics and pre-senile individuals introduced a different approach in the treatment of Wechsler-Bellevue data. Her interest was in what she calls "the *intra*-individual differences in intellectual functioning" and has consequently calculated the deviation of each subtest from the mean of all the subtests of each case. The comparison of these deviations for the several groups studied serves as a basis for her conclusions. She found, by means of this method, that her schizophrenics can be differentiated from non-psychotics with all but three subtests (Similarities, Digits and Block Designs) and that the paretics differ from non-psychotics in only two subtests—Vocabulary and Digit Symbol. Her contention is that these psychoses resemble "premature aging" since the comparison of young subjects with those of later maturity show a similar trend. Wechsler's clinical findings and Rabin's rank orders of subtest scores in schizophrenia do not substantiate this contention. A more recent study (22) on 100 psychotic and non-psychotic individuals aged 60–84 shows that even old age results of "highest and lowest ranking tests" do not compare so well with schizophrenics as thought by Magaret. Information is highest for both groups; next in order are Comprehension and Similarities for the old age group, while Object Assembly and Block Designs rank high in the schizophrenics. There is agreement on Digit Symbol and Picture Arrangement being among the lowest ranking for both groups. However, also Block Designs is among the lowest in the old age group, while Arithmetic is very low in schizophrenia. Thus, the conclusion about the "premature aging" of schizophrenics is, at best, of doubtful validity. In the same study, possible psychometric patterns in the two major psychoses of the senium (arteriosclerosis and senile psychosis) were investigated. Since the groups were not equated for age and other factors, it was felt that whatever differences were present were accounted for by the differential age factor, rather than differential psychiatric diagnosis. The findings of this study are also in agreement with those of Goldfarb, who states that "... the trend to decline with age is more consistently observed among the performance tests, all of which are timed (10, p. 66)." The "power" tests remain relatively unaffected by age.

Variability of subtest scores is essentially what is meant by *scatter*. There is little doubt among most investigators that it is characteristic of the more severe psychopathological conditions. However, the results of Gilliland and collaborators (9) are largely negative in this respect. The findings are based on 87 schizophrenics, 92 paretics, 32 manics and smaller samples of psycho-



neurotics, alcoholics and mental defectives. The subjects who scored satisfactorily on the Elgin Test Reaction Scale were selected for the study. No age, intelligence or educational factors were controlled. They found that there was some variability in all the groups, but no significant differences, in this respect, between the groups were obtainable. They also found that the schizophrenic group was "less variable" than the control group consisting of 100 hospital attendants. From the obtained results the conclusions are chiefly that whatever loss may take place it is general rather than selective or specific and that normals tend to show more variability than abnormal patients. These results are definitely in disagreement with those of Wechsler (31), Rabin (20) and Magaret (16). Neither are the results of the Menninger group, quantitative (7) as well as qualitative (26), consistent with Gilliland's findings. The discrepancy between these investigations can be mainly explained in terms of differential sampling. More specifically, while the patients, on which Gilliland's report is based, were selected by means of a definite quantitative criterion, assuming "proper attitude" to the examination, all the other studies omitted such a strict qualification. Consequently, the other studies included many patients of a widely differing psychiatric condition, instead of applying a uniform criterion. Hence the differences in variability. Gilliland eliminated that evident variability by excluding the majority of really "variable" cases, who are the less cooperative ones and those whose attitude is not up to par.

*Cases of Head Injury.* A recent British (27) study of intellectual loss following head injury employed the verbal scale of the Wechsler-Bellevue with some slight modifications. Reynell devised a "differential test" in order to determine intellectual deficit. He obtains the IQ differences based on two series of subtests. Series A consists of Vocabulary, Information and Comprehension, while Series B consists of the three remaining verbal subtests (Similarities, Digits and Arithmetical Reasoning). When the difference between the two IQs reaches "double figures," the test is positive for intellectual deficit. Series A tests were found to "hold up" in cerebral injury, while Series B tests tend to "fall away" in that condition. More than 500 war casualties with head injury were examined by this method. Of these, 120 showed positive results on the A minus B series, the difference in IQs being more than ten points. Of these, 95 cases had severe or moderate head injury. Twenty cases had a recent injury and 80 per cent of the remaining 100 cases were permanently invalidated as far as further war service is concerned. On the other hand, 80 per cent of those who had moderate or severe head injuries, but did not show a positive (A-B) score were returned to duty. The conclusions favor the use of this measuring device, not only as an indicator of present intellectual loss, but as a prognostic agent as well. However, caution should be applied, since the recency of the injury may produce unduly unfavorable results. "The longer the period between the head injury and the testing, the more significant are the findings (27, p. 719)." Some additional evidence, though not very well quantified, hints at the absence of positive results in the affective, non-organic disorders.

*Cultural and Racial Variations.* A rather extensive study of more than four hundred white and negro criminals, employing refined statistical techniques, was published under Machover's (15) authorship. Three major sets of comparisons compose the main object of the investigation. Firstly, negro criminals of widely divergent cultural backgrounds (South vs. North) are compared, while most other factors are well controlled. Secondly, white and negro criminal groups matched for age, education and IQ are compared. Finally, a comparison



between white criminals and non-criminals of the same race is investigated. The groups were investigated with the prospect of discovering characteristic "patterns." The answer to the question whether there are characteristic group patterns is given in the affirmative. The first comparison yields the conclusion that "... the culturally restricted Southern Negroes do best in Verbal Comprehension and Similarities and worst in Performance, Digit Symbol, Block Design and Picture Arrangement (15, p. 83)." Whites vs. Negroes show superiority in Arithmetic and Digit Symbol, while the Negro group is better in Similarities and Picture Arrangement. Not all of these differences are statistically reliable. The non-criminal group is superior in Information and Comprehension, while the criminal group shows superiority in Picture Completion, Object Assembly and Digit Retention.

This investigation shows awareness of the shortcomings of studies with pathological material which preceded it. Groups were equated and matched for age, intellectual level and other major factors that should be controlled during the quest for *characteristic patterns*. The findings, however, as is true in many pattern studies show insufficient relationship to actual psychological traits.

*Scatter and Patterns*. Scatter has been referred to as "the differences in subtest scores . . . (28, p. 276)." It is another expression for variability of scores which ideally should be identical or at least, close in quantitative value to each other. The major hypothesis, of the investigations dealing with this problem, is that different groups show different degrees of variability in the same or different subtests. A characteristic constellation of variabilities which is presumably fairly stable is called a *pattern*. The term has been loosely used in this connection and different methods for its determination have been employed by several investigators, as follows:

1. *Means of subtests* for the groups have been used as the only (4, 5, 8) or partial (11, 20) basis for the comparison of groups. This method is especially vulnerable and unreliable when the age and intelligence as well as cultural background factors are poorly controlled or not controlled at all.

2. The *rank order*, within the individual record or of the group means of subtests has also been used, largely as a preliminary measure (20, 21), especially in computing lists of tests which do or do not "hold up" in certain conditions of abnormality.

3. As a result of the preceding approaches and as a result of empirical data, various characteristic *Indexes* have evolved. Some are the products of ratios of certain subtest combinations to others (13, 20, 21) while others consist of differences between certain combinations (27). The latter method, especially, is a refinement of the Verbal Minus Performance Sign arrived at by several investigators (7, 13, 15, 20, 31).

4. *Intra-individual* differences in performance had been suggested as a more reliable measure of variability. The first investigation employing it is the one by Magaret (16) while others followed suit (17, 23, 24). The deviation of each subtest, from the mean of all the subtests is the measure used. In a more qualitative sense its use is amply illustrated by Wechsler (31).

5. Finally a number of other measures of scatter and combinations of subtests have been advocated. Schafer and Rapaport (28) suggest the computation of the difference between each subtest score and the vocabulary score as well as "certain internal comparisons" which are not very specific, and basically not different from some measures previously applied. There is also something to be said for the interpretation of the individual scatter (26, 31). However, the validity of its interpretation is much more dependent upon the clinical judgment and experience of the examiner, than upon an experimentally derived and statistically reliable pattern.



## RETEST DATA WITH CLINICAL MATERIAL

As part of an attempt to devise a battery of psychometric measures which will be effective in forecasting the results of insulin treatment in schizophrenic patients, Wechsler, Halpern and Jaros (33) used several subtests of the Wechsler-Bellevue Scales (Comprehension, Information and Similarities) as part of a larger battery. The test retest differences, before and after treatment, were correlated, for a large number of tests in 15 schizophrenic individuals, with the psychiatric conditions of the subjects, 6-18 months after the treatment. The Similarities test, showing a coefficient of colligation of .50 and per cent agreement of 73, was the only subtest included in the final predictive collection of 5 different tests which most effectively forecast the psychiatric condition of the patients. The authors add, however, that no single test is as effective as the combined results of the entire battery.

A more direct study with the Wechsler-Bellevue and *fluctuation* of its results in schizophrenic patients was made by Rabin (24). In this investigation the retest results on thirty schizophrenics were compared with those of thirty non-schizophrenic hospital patients, consisting largely of manic depressives, psychoneurotics and a variety of other diagnoses. A mean interval of more than a year between tests was allowed. The correlations showed  $r = .55$  for the full Wechsler-Bellevue results between the two tests in the schizophrenic group, while the other group yielded a coefficient of .89. There was improvement in the mental level of both groups. This increment was attributed to the improved "clinical picture" and to the practice effects that might be "involved in the employment of the same scale." The verbal scale showed greater stability (less change and higher correlation) upon retest than did the performance scale. The Comprehension test showed the lowest coefficient of correlation in the retest results of the schizophrenic group. An intra-test deviation analysis showed that the deviations of six of the battery's ten subtests changed upon retest, in the direction of the non-psychotic group of Magaret, included in this study for comparison. The results of 60 reexamined patients were reported in another study (23). This group included schizophrenics, manics, psychoneurotics and other diagnostic classifications. The test-retest coefficient of correlation ( $r = .84$ ) shows a degree of test stability which compares well with the findings obtained in normal individuals. It speaks for the reliability of the Wechsler-Bellevue scales as well.

Too little well-controlled work with retest data is available. Control of the age factor, duration of psychosis, and correlation with the clinical and psychiatric picture of the patients are major desiderata in studies of this type. Patients of one diagnostic group with well defined criteria and well defined changes in the intervening interval should be studied thoroughly. Provisions for the elimination of practice and familiarity effects by means of a parallel series of scales should also be made in order to throw some light on the concomitant psychometric changes that accompany the course of the mental disease.

## MISCELLANEOUS STUDIES WITH THE WECHSLER-BELLEVUE SCALES

A very significant and theoretically interesting study with the Wechsler-Bellevue was made by Balinsky (3). Starting with the hypothesis that mental organization may differ at different age levels, he applied the method of factor analysis to all the subtests (excepting Similarities) of the Wechsler-Bellevue scales which were administered to several age samples (9 years; 12; 15; 25-29; 35-44; and 50-59). Different descriptive factors were obtained at the various



age levels. This is largely, as the author writes, because "... the same abilities are not tapped by tests of intelligence at various age levels, or that the abilities themselves are not constant (p. 221)." Despite the variation in factors at the several age levels, some, like the performance and verbal factors, are quite consistent. The memory factor appears in age groups 25-29 and 35-44 only, and the G factor present in the nine year old group remains "latent" and reappears, though more weakly, in the 50-59 year group. The theoretical implications and the needs for age control in intelligence test studies become quite evident. It may also be of interest to study Balinsky's several descriptive factors at different age levels, with different clinical types.

Special conditions also led to another development in the use of the Wechsler-Bellevue, i.e., its partial application. The time limitation confined Lewinski (14) to the verbal scale only. Because of the blindness of the subjects, Hayes (12) too was limited to the verbal scale. Trist (29) uses several of the verbal subtests as a part of a brief battery for individuals of low grade intelligence. A "short form" of the Wechsler-Bellevue, based on the results of three verbal subtests (Comprehension, Arithmetic and Similarities) was devised by Rabin (25). High correlations with the full scale and other tests were obtained.

### SUMMARY AND SUGGESTIONS

The foregoing pages clearly indicate that the Wechsler-Bellevue Scales have stimulated considerable psychometric research and have supplanted some time-honored diagnostic tools. The reliability and validity of Wechsler's scales, as a whole and in part, have been proved in several studies. The consensus of opinion is that the test correlates highly with some of the best measures of intellect and that it tends to differentiate better than other measures between the dull and feeble-minded. The literature produces a dissenting opinion which is undocumented and statistically unproved. It also tends to narrow the IQ range as compared with other tests. There is considerable evidence that the Verbal Scale correlates more highly than the Full Scale or Performance Scale with most intelligence tests. The Verbal Scale compares well with other tests in predicting academic success at the college level; the Performance Scale is practically useless in this respect.

Because of its particular structure as a point scale, the Wechsler-Bellevue is easily adaptable to research in the field of mental deficit in special clinical groups in particular, and to research involving the differentiation of various groups in general. Several approaches, from a statistical and technical viewpoint, in the analysis of test findings, have been made available. The differentiation of groups by means of their attained mean scores on the various subtests is the most obvious method. This however, does not take the absolute total score magnitudes into consideration. Ranking the means of subtest scores for groups is a method which circumvents this difficulty. The differences between Verbal and Performance IQs have also been used widely. A difference in favor of the Verbal Scale, following Babcock's rationale concerning the preservation of verbal capacities and the reduction in new learning in deterioration, is probably indicative of some pathological conditions (usually schizophrenia); while a difference in the opposite direction tends to be indicative of psychopathic personality. A verbal dominance akin to that found in psychopathological conditions may also be found in Southern negro criminals. A more sophisticated method developed, deals with intra-, instead of inter-personal variations. The deviation of each subtest from the mean of all subtests in the same indi-



vidual has been used as a yardstick. This method tends to produce some results which are at variance with those obtained with the simpler methods. Special *Indexes* based on ratios between the sums of the scores of some subtests (for schizophrenia and psychopathic personality) and on differences between such combinations (cerebral damage) have also been devised. Several other methods of intra-individual variation have been suggested, but not investigated. It seems to some clinicians that the use of this method in the description and diagnosis of individual cases is possible despite the absence of sufficient statistical support. Such procedure would, to a large extent, be intuitional and dependent on the degree of clinical insight and experience of the examiner. Variability, according to most investigators is characteristic of pathological conditions. The data tends to show that the patient's emotional condition and attitude are largely responsible for this variability. A study in which the patients were selected on the basis of their good attitude in the testing situation failed to attain more variability than in normalcy.

The fact remains that the various measures of scatter and variability, the different patterns, have succeeded in differentiating *groups* but not *individuals*. The patterns are characteristic enough of certain groups, but mask the peculiarities of some individuals within those groups. Hence, thus far, on the basis of the Wechsler-Bellevue patterns we have group, but not individual, diagnosis. There is insufficient agreement even in those group differentiations. The studies failed to control all of the most important factors; they controlled some. Hence, variation in findings. Age, race, schooling, intellectual level, cultural background and degree of cooperativeness are major factors which have not been equally controlled in the several studies. For this reason, the results are not comparable. In case of psychopathological material, the diagnostic criteria, which may differ from one institution to another, must also be reckoned with if exact and comparable data is to be produced. Patterns obtained, after the above-mentioned factors are taken into consideration, may achieve a status of a differential diagnostic tool in *individual cases*. In order to achieve this degree of accuracy, the cooperative effort of several institutions may be required. In the meantime, the individual variability analysis and descriptions, and the utilization of the broad hints from the group studies have their place in clinical practice. In this connection, more qualitative studies of Wechsler-Bellevue responses and more detailed analysis of their content are wanting. Also, the investigation of several factors (based on factor analysis) in different clinical groups and at different age levels, rather than considering the subtests as *functional unities*, is an untapped source of important data.

The psychometric literature, especially dealing with psychopathological material, is lacking in retest data. Long range retest studies are rare. Only a few small attempts in which the Wechsler-Bellevue is employed, have been made. Such studies do not only throw some light on the problem of reliability, but also offer more insight into the problem of *patterns*. Quantitative measures of attitude, or behavior schedules administered to patients examined and re-examined will shed further needed light on concomitant intellectual conditions and psychometric correlates of various behavior and personality disorders.

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# "ONE HUNDRED YEARS OF AMERICAN PSYCHIATRY"

## A SPECIAL REVIEW\*

DAVID SHAKOW

*Worcester State Hospital*

In those halcyon postwar days when even librarians shall have succumbed to the pressure of streamlined living and replaced the complex Dewey "classification" with a simple chronological classification, the library browser's attention will be drawn immediately to this robust Adonis of a volume standing out so prominently among the war-starved runts of 1944. He will be impressed with its structure: the half-rag specially water-marked paper, the wide margins, the attractive type, the gravure illustrations (of persons and institutions important in the history of psychiatry), the specially designed emblem and the generally outstanding printing job.<sup>1</sup> His surmise that the responsibility for the production of the volume must have been a true bibliophile's will gain considerable support from such items as the account of the pains taken to unearth the signature of Dr. Samuel White, one of the original thirteen founders.

Even the more careful and sophisticated reader will agree with the casual browser that the work, except for the few typographical errors which have eluded the proof readers, meets the highest standards of bookmaking and comes close to the limit of realistic bibliophilic aspiration for a volume of this nature. In some ways, however, so high an achievement in form places an unfair burden on the contributors for, both consciously and unconsciously, it sets the reviewer to expecting from them at least equal achievement in content. A set of this kind is particularly difficult to avoid in the case of a work by psychiatrists since they above all others may be expected to see beyond externals.

The volume consists of two introductory statements and fifteen chapters (the latter varying in length from fifteen to ninety-four pages) contributed by thirteen different authors.

In presenting the volume, Gregory Zilboorg, who appears to have been the managing editor and coordinator, describes the goal as the achievement of "a historical synthesis of a century of American psychiatric evolution . . . a survey of psychiatry as a growing cultural force . . ." Psychiatry is treated "within the frame of reference which a synthesis, not a symposium, imposes . . ." He elaborates further with a statement to the effect that uniformity of perspective rather than uniformity of opinion was aspired to by the authors of the several chapters. J. K. Hall, in the introduction, considers the American geographical and historical setting in which the American Psychiatric Association (then the Association of Medical Superintendents of American Institutions for the Insane) was founded in 1844 and describes the conditions of the inception and production of the volume.

The first chapter, by R. H. Shryock, presents the beginnings of psychiatric history in this country from colonial days to the founding of the Association. H. E. Sigerist follows with the story of psychiatry in the various European

\* Hall, J. K., Zilboorg, G., Bunker, H. A. (Eds.). *One Hundred Years of American Psychiatry*. New York: Columbia University Press, 1944. Pp. xxvi+649, numerous illustrations.

<sup>1</sup> The volume was actually designated by the American Institute of Graphic Arts as one of its selections for the month of July, 1944.



countries during the middle of the 19th century. This serves as a backdrop against which Winfred Overholser depicts the founding of the Association and the personalities of its thirteen founders. The longest chapter (94 pages), on *The History of American Hospitals* by Dr. Samuel H. Hamilton follows. The next three chapters: *A Century of Psychiatric Research* by J. C. Whitehorn, *American Psychiatric Literature during the Past One Hundred Years* (77 pages) by H. A. Bunker, and *The History of Psychiatric Therapies* (51 pages) by William Malamud, form an inter-related group. Albert Deutsch then presents *The History of Mental Hygiene*. Another related group is formed by the three chapters on *Military Psychiatry*, the first and last by Albert Deutsch, on the Civil War and the World War II periods respectively, and the second by Edward A. Strecker on the World War I period. The last four are relatively independent chapters: *A Century of Psychology in its Relationship to Psychiatry* by T. V. Moore, *American Psychiatry as a Specialty* by H. A. Bunker, *Legal Aspects of Psychiatry* (78 pages) by Gregory Zilboorg, and *The Influence of Psychiatry on Anthropology in America during the Past One Hundred Years* by Clyde Kluckhohn. Except for those whose length is indicated in parentheses, the articles run from approximately fifteen to forty pages.

The intrinsic difficulty of the task of reviewing this multi-authored volume can be lessened to some extent by first considering briefly the individual contributions which are of relatively less importance to the psychologist, by then considering at greater length those which are especially pertinent for him, and by following it finally with a consideration of the volume as a whole.

The two background chapters provide the appropriate screen against which to see the developments of psychiatry in the last one hundred years. (One wishes that the Sigerist chapter were a little fuller.) Overholser provides a good start on this with his portraits of the founders. Hamilton's chatty chapter is full of interesting and important facts about the development of institutional psychiatry from its beginnings in the workhouse and almshouse through the lunatic asylum and lunatic hospital to its present status as represented in the state and private hospitals. He discusses the various aspects of psychiatric administration and provides several valuable statistical tables. The presentation, however, suffers somewhat from insufficient organization. It is a little strange, too, to find in a chapter on "American Mental Hospitals" no mention of Bryan at Worcester and Read at Elgin, two superintendents who have done so much in the recent period to raise the standards and set the goals of state hospitals. (In fact it is surprising that Bryan's name does not appear at all in the volume except for Bunker's listing of his book on *Administrative Psychiatry*. Present-day administrators do not fare well at the hands of these psychiatric historians even when their influence, direct and indirect, on research, therapy and administrative procedures has been great.)

The chapters on Literature (Bunker), Therapy (Malamud), and Legal Aspects (Zilboorg) are the high lights of the volume. It is difficult to choose among them—they are all of such excellent quality. Each may, however, be singled out for its particular strength: the Bunker article for its careful, smooth scholarship and its accurate tracing of an important point of view; the Malamud article for its effective organization and clear presentation of a difficult topic; and the Zilboorg article for its lively and detailed presentation of a fundamental social psychological problem.

It appears to a psychologist that Bunker's article misses the part played by the more strictly psychological journals such as the *Psychological Bulletin*, the *Journal of Abnormal Psychology*, the *Psychological Clinic* and the *American Journal of Psychology* in helping to spread psychiatric notions. (He lists the



first three as "psychiatric" journals!) When it is considered that the first American psychological journal was founded in 1887, 43 years after the founding of the first psychiatric journal, the contribution seems considerable. Actually he himself has many references to articles in psychological journals. Thus, of the series of some half-dozen articles by Adolf Meyer appearing during the period 1903 to 1911, referred to by Bunker as "a group of articles which collectively considered, form without any doubt, in their path-breaking character and their enormous influence upon American psychiatry, the most original and the greatest single contribution to American literature,"<sup>2</sup> three were published in psychological journals (*American Journal of Psychology* and *Psychological Bulletin*). This minor flaw is, of course, negligible when compared with the detailed and thorough portrayal of the development of the functional as opposed to the anatomical point of view, as well as of other aspects of psychiatric progress reflected in the literature.

The article by Malamud lucidly and succinctly presents the evolution of therapeutic notions in American psychiatry. His account impresses one with the important part played in this development by laymen such as Dix, Tuke and Beers, persons who could see the problem either from the very outside or from the very inside. The reader cannot help feeling that an important lesson is here to be learned, one which has important implications for the current controversy with respect to medical care, particularly in relation to the position taken by some medical groups that such care is a strictly medical problem.

Zilboorg's chapter on legal aspects traces the successive advances and retreats in the battles between enlightened psychiatrists holding for the existence of a pathology of feeling without a pathology of intellect ("the irresistible impulse") against unenlightened law which insists on pathology of intellect as the criterion of insanity. The essay very properly revolves mainly about Isaac Ray, a striking instance of the man much ahead of his time.

The chapter by Deutsch on mental hygiene sets forth in very adequate fashion the development of this important aspect of psychiatry as related to other social developments of the period.

The three chapters on military psychiatry should be made required reading for recent critics of the "I-heard-of-a-case" school (the graduate department of Stanley Cobb's "I-know-a-case" school) who make wide-sweeping criticisms on the basis of isolated instances and minor imperfections. The Strecker chapter strikes one as being somewhat too detailed for this type of volume, but the three articles together certainly impress the reader with the great strides made by psychiatry in dealing with military problems, despite the great handicaps with which it has had to contend.

*Psychiatry as a Specialty* (Bunker) is an interesting chapter but its purpose, at least to the psychologist, is somewhat obscure; implicitly or explicitly its contents are to be found in other chapters.

The chapter on anthropology by Kluckhohn really belongs with the three superior chapters mentioned earlier. The only reason for not having included it with the others is its quite different content. From a dynamic psychological standpoint it is the most sophisticated of all the chapters, in fact the only one which really probes below the surface. Besides being excellently documented in the region of overlap of anthropology and psychiatry, a thorough grasp of the

<sup>2</sup> If not explicitly, at least implicitly, the volume is dedicated to Adolf Meyer. His is the only portrait of a living person included, and after Freud, his name occurs most frequently in the index. The evidence for his great influence permeates almost every chapter.



relationship between the two is revealed. It recognizes the debt which anthropology owes to psychiatry but at the same time delineates anthropology's own field of activity and point of view, both of which it expects to have recognized in its relations with psychiatry. The important part which Sapir has played in the association of the two disciplines is duly recognized and emphasized.

We may now turn to a consideration of the two chapters which are of special importance for psychologists, viz., Whitehorn's on research and Moore's on psychology.

Although by the ordinary standards of journal articles Whitehorn's chapter is an adequate sketch of the high points of psychiatric research, in the present setting it is disappointing. The author has missed an unusual opportunity to carry through the difficult task of which he is capable, viz., to indicate, at this strategic stage of the development of psychiatry, the meaning and direction of psychopathological research in America, both past and present, to evaluate this research and to point out the promising lines for future development. (It was particularly important not to miss this opportunity because of the narrow evaluational article by Myerson in the anniversary issue of the *American Journal of Psychiatry*.) Such an exposition would necessarily have resulted in one of the longest articles in the series; instead we have one of the shortest. Aside from its brevity, it is rather poorly systematized, only superficially evaluative and in its discussion of research developments mainly organized around the very inadequate and secondary classification of geography, rather than that of concept. A striking instance of the incompleteness of the production is the omission of even the mention of Charles B. Dunlap's work in pathology, work which Bunker, in the very next article in the volume, calls "one of the outstanding contributions to American psychiatric literature" and representing the major work of "one of the most thorough, scrupulous and rigorously scientific workers whom American psychiatry has known."

Under such circumstances it is not surprising that the minor contribution which psychology has made is not recognized. As an instance, let us take the case of McLean Hospital. Whitehorn points out that perhaps the most definite reply to Weir Mitchell's severe criticism (at the semi-centennial meeting of the Association) of the contemporary state of psychiatry was to be found in an account by Hurd "of the provision made for intensive laboratory research in the basic medical sciences of pathology, physiology and biochemistry" at McLean Hospital. The fact "that the major emphasis of this pioneering enterprise was put upon physiology and biochemistry—the study of the living, rather than of tissues post-mortem" was "an interesting indication of the direction of thought." The conscious or unconscious change of "physiological psychology" in Hurd's text to "physiology" in Whitehorn's is a little hard for the psychologist to take! If anything is clear from Hurd's article,<sup>3</sup> G. Stanley Hall's article,<sup>4</sup> Cowles' presidential address,<sup>5</sup> Hoch's report on Kraepelin,<sup>6</sup> Cowles' enthusiastic

<sup>3</sup> H. M. Hurd. The New McLean Hospital. *Amer. J. Insan.*, 1895-96, 52, 502.

<sup>4</sup> G. S. Hall. Laboratory of the McLean Hospital, Somerville, Mass. *Amer. J. Insan.*, 1894-95, 51, 358-364.

<sup>5</sup> E. Cowles. The Advancement of Psychiatry in America. *Amer. J. Insan.*, 1895-96, 52, 384.

<sup>6</sup> A. Hoch. Kraepelin on Psychological Experimentation in Psychiatry. *Amer. J. Insan.*, 1895-96, 52, 387-396. August Hoch was appointed to be in charge of the McLean laboratories. As part of his preparation he went to study the Wundt-Kraepelin techniques in Kraepelin's laboratory (cf. Hall, *ibid.*).



reception of the *American Journal of Psychology* because of its concern with the "new psychology" and its promise of "concrete application" to the alienist's clinical needs,<sup>7</sup> and Cowles' article in Hurd,<sup>8</sup> it is that physiological *psychology* was involved. It was physiological *psychology* in which Cowles was so much interested and towards which he had been directed by Stanley Hall under whom he had taken psychology and with whom, when the latter was medical superintendent (!) of Bay View Hospital for the Insane, Cowles had worked.<sup>9</sup>

If Whitehorn's chapter is disappointing then Moore's is nothing less than distressing, particularly so to the psychologist since it is the one which for him is most important and with which, in this setting, he most naturally identifies. Instead of meeting his expectation, based on the author's standing and peculiar fitness for the task by reason of his expertness in both disciplines, that it will be among the best chapters, he is reluctantly forced to conclude that it is the poorest in the volume. The bases for this judgment are various and lie in the nature of the tone and style, as well as the content.

With respect to style, one can find neither a clear conception of the task involved in the writing of such a chapter nor a unifying principle of organization. There is a tendency to repetitiousness, irrelevancies of a reminiscent and historical nature (cf. pages 468 and 457), and loose writing (e.g., a list of 83 persons is referred to as a table of "several" psychologists, p. 448). In a volume which is on the whole singularly clear of typographical and similar errors, Thurstone's initials are given as "E. L." (p. 449), Harrell is referred to as "Howell" (p. 462) and "psychology" is written for physiology (p. 446). I mention these minor defects not because of their intrinsic importance but because they reflect the more important contentual carelessness which is so frequent.

The combination of a very definite positive view, viz., neoscholasticism, and very definite negative views, viz., anti-sensationalism, anti-behaviorism, and anti- "social-service psychiatry" carry Moore into *ad hominem* arguments, extreme statements and irrelevant criticisms of different schools, criticisms not at all related to the problem of the relations of psychology and psychiatry (cf. the criticism of gestalt psychology, pp. 465-466).

Thus his positive philosophical approach leads him to identify Adolf Meyer with (perhaps unwaredly) "reviving some of the fundamental concepts of scholastic philosophy" (pp. 455-456, 458). His negative attitude to behaviorism leads to the gratuitous assumption that "Psychobiology . . . had its origin in the hopelessness of the behaviorism of John B. Watson and of the experimental psychology of Knight Dunlap" because, after conducting a course in psychology in collaboration with Watson and Dunlap for one year, Meyer conducted the course alone thereafter (p. 455)! It is, of course, possible that the assumption is correct but Moore offers not the least bit of evidence for this. In fact, certain data available to us make the assumption quite unlikely, at least as it applies to Watson. On one occasion, for instance, Meyer speaks of Watson's work as one of several contemporaneous developments fostering "a wholly unprecedented burst of dynamic interest in man . . . and in the study of the functioning of the

<sup>7</sup> E. Cowles. The American Journal of Psychology. *Amer. J. Insan.*, 1887-88, 44, 544-546.

<sup>8</sup> H. M. Hurd. *The Institutional Care of the Insane in the United States and Canada*. Baltimore: Johns Hopkins Press, 1916. II, 618-636.

<sup>9</sup> A. Meyer. In Memoriam, G. Stanley Hall. *Amer. J. Psychiat.*, 1924-25, 4, 151-153. Bay View appears to have been a hospital connected with the Johns Hopkins University Medical School.



human organism as a personality."<sup>10</sup> Further, Watson, in his autobiography,<sup>11</sup> expresses his gratefulness to Meyer for coming over to Watson's laboratory each week with his whole staff for the purpose of discussing the manuscript of *Psychology from the Standpoint of the Behaviorist*. To look at the matter from another side, it is a questionable compliment to Meyer to imply that psychology was conceived on the rebound!

His antagonistic attitude to "social-service psychiatry" leads Moore to talk about a "tendency (which) has arisen to eliminate the psychologist from the child guidance clinic and to get rid of all psychometrics (p. 474)." Those well acquainted with the prevailing situation would be surprised at this statement. Actually, when a comparison is made between the data in the table which he has constructed, based on the 1940 Directory, and a similar table found in the 1936 Directory, it will be seen that the trend for New York, the state about which he is most concerned, is actually in the direction of an increase in the employment of psychologists for community clinics. Moore seems to be unacquainted with the New York situation where many of the psychiatric clinics are sent out from the State Hospitals almost exclusively to check on their own adult patients who have been released into the community. For such a purpose only a psychiatrist and a social worker would, except rarely, be necessary.

Moore has misinterpreted, too, the Witmer statement (p. 476) with respect to the dropping out of routine psychological examinations in child guidance clinics. Such a policy does not mean, as Moore thinks, the elimination of the psychologist. Rather does it mean that the psychologist is taking on other, broader, functions just as are the other members of the clinic team whose routine physical examinations and routine family investigations are also being reduced. The trend is one to be welcomed rather than deplored, as Moore would discover if he were to consult the numerous psychologists now concerned with improving the status of clinical psychology. We must also note the several extreme statements in this context, e.g., references to psychologists being "eliminated," "ousted," considered "superfluous" and a reference to a tendency to "get rid of all psychometrics."

In addition to pointing out these inaccuracies two other points should be made with respect to the general tone of the article. I refer to its unwitting arrogance and its lack of dignity. Evidence for the former may be found in what seems to be an underlying assumption of the article, viz., that the term "relationship" in the title refers only to the influence which psychology has had on psychiatry. The considerably greater influence which psychiatry has had on psychology, particularly the influence of Freud and of psychoanalysis, is never even considered. The closing sections, those which discuss the place of the psychologist in the child guidance clinic and the conflict between psychology and psychiatry in the 1916-20 period, are rather picayune. The reader cannot avoid making the obvious but painful comparison of Moore's article on psychology with the modest, dignified and mature presentation of Kluckhohn on anthropology. In the latter case the reader is left with the feeling that the author knows just where the stand should be taken in a relationship between two disciplines, each of which has its own contribution to make. In the case of psychol-

<sup>10</sup> A. Meyer. The Organization of Community Facilities for Prevention, Care and Treatment of Nervous and Mental Diseases. *Proc. First Internat. Cong. on Mental Hyg.* New York: Internat. Cong. for Ment. Hyg., 1932, p. 246.

<sup>11</sup> Carl Murchison, (Ed.). *History of Psychology in Autobiography*. Vol. III, Worcester: Clark Univ. Press, 1936, p. 279.



ogy, he is left wondering what all the lamentation is about and with his respect for it anything but enhanced. One could go on with other instances of these more formal inadequacies but it is necessary to turn now to the fundamental aspects of the contribution, viz., its content.

What may one reasonably expect to find in an article on the relationship of two such disciplines as psychology and psychiatry? Essentially the following: A consideration of the intellectual influences, in the sense of ideas, methods, points of view, and the "propagandist" influences, in the sense of aid of a non-professional kind such as promotive, of one discipline on the other, whether they be direct or indirect, definite or presumptive. One might expect, in addition, a discussion of the working relationships of the disciplines in the past and an evaluation of the outlook in this respect for the future.

Of these various aspects Moore limits himself almost entirely to the intellectual influence of psychology on psychiatry and he does this in such a way that it is generally difficult to tell whether the influence is direct or indirect, definite or merely presumptive. He mentions not at all the propagandist contributions of psychology, as seen, for instance, in Hall's influence through the founding of journals and the support of various movements, and James' influence in the founding of the mental hygiene movement, which is even greater than Deutsch, in the chapter on "Mental Hygiene," has indicated. He touches on the relations of the two fields but never in a manner which would indicate that the true interpenetrative complexity of the relationship has been recognized.

Early in the paper Moore presents a list of 83 psychologists (actually of those included, two, Rorschach and Rosanoff, were *not* psychologists in any technical sense or in the sense in which he uses the term) "whose names were looked for in 93 textbooks of psychiatry appearing in the United States from 1861 to 1942, and gives the number of times a reference to their work was found." There are no explicit conclusions drawn from the list in the body of the article, but the implication, on the basis of the discussion which precedes it, is that very little psychological material gets into psychiatric texts. That this is true I would not dispute, but I am disturbed about the method used to arrive at the conclusion. In the first place, the list is motley and strange, containing the names of persons who, however important their contribution to other fields, have done very little related to psychopathology, e.g., Hartshorne, Ogden, Otis, Washburn. Then it omits the names of persons who with much more reason should have been included, such as, among Americans: Bronner, Doll, Franz, G. H. Kent, Landis, Sidis, F. L. Wells, Witmer.<sup>12</sup> (His Europeans are more adequately selected.)

But assuming that the list contained only appropriate names, the compilation of such a list is in itself naive and at best pseudo-objective. Influence, as any historian of ideas knows, is frequently most difficult to trace. The fact that a name is not mentioned in a book is no criterion that the author was not influenced by the person involved. This is true for two reasons: (1) textbook writers, especially the older textbook writers and even more especially non-

<sup>12</sup> The name of H. Gruender is included in the list. Since the name aroused no associations, psychological or otherwise, the APA yearbook, the *Psychological Register*, Hunt's *Personality and the Behavior Disorders* and several histories of psychology were searched but no reference could be found. Finally, a reference was found in *Minerva* (1930) which indicated him to be Professor of Psychology at St. Louis University and in the *Psychological Abstracts* for 1932 an abstract of a book of his on experimental psychology was found. The excerpt given there provides a cue as to why he did not influence psychiatry.



academic textbook writers, are not accustomed to giving credit or references. (Until recently this was also generally true of elementary textbooks in psychology.) Particularly in psychiatry, where the textbooks are largely concerned with nosology, the theoretical and experimental suppositions are at most implicit. (2) Influence is so often indirect and unconscious that it needs a Lowes or a Boring to unearth it. Thus, supposing Herbart had been included in Moore's list, and it could be shown that Herbart influenced Griesinger profoundly, and that Griesinger in turn influenced the writers of early American textbooks, Herbart might not at all be mentioned by the latter but actually his influence might have been considerable. Historical research unfortunately (or fortunately) needs more than the turning over of the "preparing of a table" to a "statistical assistant (p. 448 n.)."<sup>13</sup>

But, again, the list is after all a minor matter. Any student of the subject knows that the influence of conventional American psychology on psychiatry has not been very great. It is, therefore, particularly disturbing to find that the few major influences have been omitted. G. Stanley Hall is not mentioned at all (except in the list) although there are seven references to him by the other, non-psychologist, contributors. Hall, the propagandist, who gave Freud his first academic hearing, who gave courses in Freudian psychology beginning in 1908 and whose pressure for its consideration remained life-long; Hall, who influenced Cowles in establishing the psychological laboratory at McLean Hospital which had as directors following Hoch, Franz, Wells and Lundholm; Hall, who stimulated Adolf Meyer, by his early interest in child study, to write his first paper on a psychiatric topic—*Mental Abnormalities in Children during Primary Education*<sup>14</sup>—and who did so much to make the country child-conscious; Hall, whose students Goddard and Huey (also Meyer's students at the Worcester State Hospital) did the early pioneer work on feeble-mindedness;<sup>15</sup> Hall, whose bravery in handling the problem of sex did so much to break down the first barriers, thus greatly facilitating the later child guidance handling of this and related problems; Hall, whose student Terman achieved so much in the development of the Binet method in the United States and whose student Gesell did so much for other aspects of developmental psychology; Hall, whose journals regularly published material of psychopathological interest; Hall, the ramifications of whose psychological influence are most pervasive in fields related to psychopathology—it is this man who is entirely omitted in the consideration of the influence of psychology on psychiatry.

William James is another major influence whom Moore does not mention except in his list. In the latter it is indicated that text references to him have been found fourteen times, the second highest after Binet who has a score of fifteen. Despite this obvious hint James is not considered and the many aspects of his influence on psychopathology among which were his wide influence through his *Principles* and *Varieties*, and his deep and lasting interest in exceptional mental states (on which he delivered a Lowell Lecture Series) are missed.

<sup>13</sup> I do not wish to raise a question as to the accuracy of the statistical work in the table, since I have not attempted to check it. However, casual examination of the first standard psychiatric text which comes to hand (Strecker and Ebaugh, 4th ed., 1935) records the name of Kuhlmann in the index—a name which is given a zero frequency in the table.

<sup>14</sup> *First Internat. Cong. on Mental Hyg.*, p. 241.

<sup>15</sup> Cf. H. H. Goddard. In the Beginning. *Train. School Bull.*, Dec. 1943. Hall recommended Goddard for the Vineland position.



His high evaluation of these special conditions led him to state, during the height of the psychophysical period in psychology, that these phenomena threw more light on human nature than did the work of the psychophysical laboratories. James' propagandizing influence, viz., his mental hygiene interests already mentioned, and his influence through students such as Healy, Sidis, Thorndike, Yerkes and Woodworth are forgotten. No recognition is given to the indirect, but nevertheless important, effects of the "humanization not only of psychology but of philosophy through William James' espousal of the characteristically American concepts of pragmatism, instrumentalism, and the humanization of religious experience," of which Adolf Meyer speaks.<sup>16</sup>

Boris Sidis, who, at least until 1908 when he took his medical degree, was distinctly a psychologist, is not even mentioned in Moore's list. He thus misses the influence which Sidis, and therefore indirectly William James, had on William A. White with whom the latter worked on dissociated states at the New York State Pathological Institute. White himself says of this association, "It was an exceedingly interesting, valuable, and I believe crucial experience for me personally. Almost without knowing it I absorbed the rudiments of what was subsequently to be the doctrine of the unconscious and accepted in my attitude toward these problems the principle of determinism in the psychological field."<sup>17</sup>

Several times (cf. especially pp. 448, 477) Moore refers to a body of experimental data which is available for application to psychiatry. Nowhere, however, does he actually indicate what it is or what its possible applications are. He apparently has reference to the type of data which is so ably presented in the volumes edited by Hunt on "Personality and the Behavior Disorders," but insofar as the article itself indicates these data are illusory. His concluding paragraph says: "When we look back over the relations of psychology and psychiatry in the past hundred years, what a marvelous growth has taken place in each science! Benjamin Rush, just before the dawn of the hundred years we have reviewed, turned to psychology as he found it, but there was little to find. In the years that have elapsed psychology has grown. There is a large body of experimental empirical research in the field of psychology that has never been evaluated for psychiatry; there are methods and techniques that have been developed in psychology that would open up vast tracts of the *terra incognita* of psychiatry. Only when psychiatry is based on a sound and broadly adequate psychology can it make the progress that physiology has made possible for medicine." It is regretted that Moore has nowhere in the article revealed the actual nature of this body of knowledge or actually described any of these Columbian techniques!

I have considered the specific chapters at lesser or greater length. What is the impact of the work taken as a whole?

In presenting the volume, Zilboorg says that it "will have to be looked upon and stand as a whole," and emphasizes that what was intended was a "synthesis, not a symposium." It is somewhat difficult to appreciate the distinction which he draws between these terms. They would appear to arise from two different universes of discourse and it is doubtful if they can be contrasted in this manner. The symposium, whether in the form of conversation, panel

<sup>16</sup> *Ibid.*, p. 245. Cf. also Coriat's statement that the interest in psychotherapy in the Boston area was probably originally stimulated by James (*Psychoanal. Rev.*, 1945, 32, 2).

<sup>17</sup> W. A. White. *Forty Years of Psychiatry*. New York: Nerv. and Ment. Dis. Pub. Co., 1933. Pp. 20-21.



discussion or round-table, may or may not result in a synthesis depending on the amount of "putting together" of ideas which is achieved.

But terms aside, how successful is the result attained? From several statements which Zilboorg makes, and which are clearly corroborated by the internal evidence, one gathers that the various authors wrote their articles quite independently and that actually, except for dividing up the topics and perhaps discussing a general point of view, little effort was directed towards integration. It would otherwise be hard to explain the amount of duplication and repetition which occurs. The degree of synthesis which is attained seems more or less fortuitously derived from a point of view held in common by several of the contributors rather than from any systematic and deliberate attempt to achieve it.

For many reasons one wishes that there had been less democracy in the process; or to put it more accurately, less *laissez-faire* and more true democracy. It would seem that each author could have been left with "complete freedom of judgment and opinion" and his own "trend and even bias" and still a synthesis achieved beyond one which consists only of "uniformity of perspective." In a collaborative enterprise of this kind, in fairness to those other important partners in the undertaking, the readers, group acceptance of mutual self-criticism during the process of preparation of the articles would seem to be essential. A final integrating article by the coordinating editor would also have helped. Such a closing chapter would have resulted in a much more complete unification than has been achieved by mere arrangement. It is rather strange and peculiarly unsatisfying from the "closure" standpoint to read through a volume devoted to a hundred years of psychiatry only to end up with a final chapter on anthropology. This very fact would imply that such a goal was never in the true sense envisioned. It is difficult to avoid suspecting that the talk of synthesis involves at least some element of rationalization. Although it is true that the impressionistic technique employed in the organization of the volume partially achieves results of the kind intended, the question arises as to whether a synthesis of mere perspective was not too cheap a price to settle for; the volume as a whole deserved a higher level of synthesis.

The shortcomings pointed out in *One Hundred Years of American Psychiatry* should by no means be permitted to divert the reader's attention from the many valuable contributions which the volume makes to the true understanding of the development and place of this related discipline. Some of these have already been discussed; space, unfortunately, does not permit the enumeration and elaboration of the others.

There is one point of paramount importance to psychology which must, however, be mentioned. As the reader progresses through the volume a question arises which becomes increasingly persistent in its demand for an answer: Where is the evidence for the oft-repeated assertion that psychology is the basic science for psychiatry, in the manner in which physiology is for medicine? One must admit that there is little to be found in this volume, and it seems to be generally true that the psychology contributed by the academies has had little influence on the development of psychiatry. An attempt to inquire into the reasons why this plausible hypothesis has not been corroborated goes beyond the compass of a review. However, it is a question which psychology must find the answer to both for its own development as well as for the development of an important section of psychiatry.



# PSYCHOLOGY AND THE WAR

Edited by  
DONALD G. MARQUIS

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## PSYCHOLOGICAL TESTING AND RESEARCH IN THE BUREAU OF NAVAL PERSONNEL: WORK OF THE NAVY'S TEST AND RESEARCH SECTION

### STAFF OF THE TEST AND RESEARCH SECTION\*, TRAINING, STANDARDS AND CURRICULUM DIVISION, BUREAU OF NAVAL PERSONNEL

Since 1939, and more particularly since the end of 1942, an extensive program of psychological test construction and other research in the Navy has been directed toward the solution of problems in determining: 1. who shall be admitted to the Navy, 2. how naval personnel can be most effectively used, and 3. by what means training programs can be rendered most efficient. This report describes the development of psychological tests and personnel research carried on by the Test and Research Section in the Bureau of Naval Personnel.

The mission of the Test and Research Section is to develop psychological tests and to carry on research for use in the Navy's personnel and training programs. Assistance has been given in all phases of the classification and training of officer and enlisted personnel from the time an individual is examined for qualification for admission to the Navy, through indoctrinational and basic training and various types of technical preparation, until he is satisfactorily placed in a specific assignment for duty (billet) aboard ship or at a station.

The Test and Research Section is organized within the Standards and Curriculum Division of the Training Activity of the Bureau of Naval Personnel. Four Units comprise the Section:

\* The personnel of the Test and Research Section are listed in Chart I.



CHART I  
ORGANIZATION OF TEST AND RESEARCH SECTION WITHIN THE BUREAU OF NAVAL PERSONNEL

NAVY DEPARTMENT

BUREAU OF NAVAL PERSONNEL

TRAINING

STANDARDS AND CURRICULUM DIVISION

Comdr. C. R. Adams, USN, *Director*  
Comdr. P. A. Jones, *Assistant Director*  
Comdr. A. J. Bartky, *Assistant Director*  
Lt. R. A. Woodall, *Administrative Assistant*

TEST AND RESEARCH SECTION

Lt. Comdr. R. N. Faulkner, *Officer-in-Charge*  
Lt. D. B. Stuit, *Assistant Officer-in-Charge*  
Lt. L. C. Fowler, *Administrative Assistant*  
Dr. H. R. Haggerty, *Editor*

SELECTION TEST UNIT

Lt. G. L. Bond, *Officer-in-Charge*  
Bloom, R. F. Lt.  
Brundage, E. G. Lt.  
Coffey, W. C. Lt. (jg)  
Cruikshank, R. M. Ens. (W)  
Darling, W. C. Lt.  
Owens, W. A. Lt. (jg)  
Shafer, H. M. Lt. (jg)  
Wexler, M. Lt. (jg)  
Williams, E. B. Lt.  
Zirkle, G. A. Lt. (jg)

ACHIEVEMENT TEST UNIT

Lt. D. G. Ryans, *Officer-in-Charge*  
Batchelder, H. T. Lt. (jg)  
Bechtoldt, H. P. Lt. (jg)  
Carstater, E. D. Lt.  
Cooper, J. B. Lt.  
Jackson, J. S. Lt. (jg)  
Monroe, A. E. Lt.  
Porter, R. B. Lt. (jg)  
Schneider, A. E. Lt. (jg)  
Tiedeman, S. C. Lt.

RESEARCH UNIT

Lt. G. V. Lannholm, *Officer-in-Charge*  
Dr. C. R. Pace, *Civilian Head*  
Curtis, J. F. Ens.  
Gibson, D. L. Lt. (jg)  
Maucker, J. W. Lt.

RADIO MATERIEL UNIT

Lt. Comdr. D. D. Feder,  
*Officer-in-Charge*  
Gettys, L. E. Ens. (W)  
Lawrence, W. R. Lt.

The following persons were formerly directly associated with the test and research program: Comdr. A. C. Eurich, Lt. Comdr. F. H. Bowles, Lt. Comdr. C. G. Houston, Lt. R. B. Embree, Lt. H. A. Graver, Lt. E. Porter, Lt. (jg) W. F. Johnson, Lt. (jg) V. B. Van Dyke, Mrs. H. Blau, Mrs. M. Yampolsky.



The *Selection Test Unit* is responsible for developing and validating aptitude tests for officer and enlisted personnel and advancement in rating examinations for enlisted personnel.\*

The *Achievement Test Unit* is charged with constructing examinations to measure the accomplishment of trainees in Navy schools and training programs for officers and enlisted personnel.

The *Research Unit* conducts over-all studies on problems of selection of personnel for training, classification of personnel for duty, measurement of achievement, and other research on problems of training.

The *Radio Materiel Unit* represents an integrated program of test development and research on the selection and training of Radio Technicians, one of the Navy's high priority programs.

The organization and personnel of the Section are shown in Chart I.

The work of the Test and Research Section originates either through requests for tests and research studies made to the Section by Navy activities or establishments or through projects initiated by the Section which it considers to be important. Work has been done for use by, and in cooperation with, other sections within the Standards and Curriculum Division (Billet Analysis Section, Educational Services Section, Instructor Training Section), other divisions within Training (Field Administration Division, Quality Control Division), and other Activities of the Bureau (Planning and Control, Officer Personnel, Enlisted Personnel). The Section has also provided services for the Commander-in-Chief of the United States Fleet, and the Operational Training Commands and the Amphibious Training Commands of the Atlantic and Pacific Fleets.

The majority of projects carried on by the Section are developed as cooperative enterprises, often involving extensive study of the field situation. Visits to appropriate Navy installations are made and conferences are held with the personnel directly concerned. Test construction is based on first-hand study of the situation in which tests are to be used. Research studies usually involve temporary duty assignments to the activities for which projects are developed. Within the Test and Research Section, the work is also characterized by the participation of a number of individuals in the development of tests and research. Although the Section is divided for administrative purposes into the four units, with major responsibility for developing projects usually assigned to one of them, a large measure of inter-unit cooperation among the personnel of the Section is practiced.

#### DEVELOPMENT OF THE PROGRAM OF PSYCHOLOGICAL TEST CONSTRUCTION AND PERSONNEL RESEARCH

Although psychological tests were used in the Navy as early as 1912, there was no organized program for testing personnel prior to 1924, when a General Classification Test was used to select enlisted men for Navy schools. Other tests were subsequently introduced, and at the time of Pearl Harbor there were in general use the following tests: General Classification Test, Mechanical Aptitude Test, Arithmetic Test, English Test, Spelling Test, and Radio Code Test. Some achievement tests, developed for use in determining qualifications for advancement in rating of enlisted personnel, were also administered.

\* Enlisted personnel are "rated" in their specialties, e.g., Gunner's Mate, Radioman, Signalman, and advanced in pay grade within their ratings, from Third Class to Second Class to First Class to Chief, on the basis of studying training manuals, passing examinations, and otherwise demonstrating ability to perform the duties of the next higher grade or level.



Useful as these tests may have been in peacetime; they were not adequate for the personnel and training programs of the expanding Navy. Accordingly, when the Bureau of Naval Personnel was reorganized in the summer of 1942, there was widespread recognition of the need for developing tests of aptitudes and for research on personnel and training programs. To meet this need a Test Construction Group and a Research Group were established in the Standards and Curriculum Section, Training Division, Bureau of Naval Personnel. As the training program increased, the Training Division became one of the major Activities of the Bureau, the Standards and Curriculum Section became a Division within the Training Activity, and the Test Construction Group and Research Group were expanded into the Test and Research Section.

#### ACCOMPLISHMENTS OF THE PROGRAM OF PSYCHOLOGICAL TEST CONSTRUCTION AND PERSONNEL RESEARCH\*

At the time the Test Construction Group and the Research Group were established late in 1942, there had been preliminary studies of the existing aptitude tests for enlisted personnel. Tests had also been constructed for use in procuring men and women officers and recruiting enlisted WAVES.

Since then many tests have been developed for officers and enlisted personnel. Chart II shows the Navy activities in which these tests are used.

#### CHART II TESTS FOR QUALIFICATION, SELECTION, AND CLASSIFICATION *Used in Qualifying Personnel for The Navy, in Selecting Personnel for Training and in Classifying Personnel for Duty*

##### OFFICERS

###### AT OFFICES OF NAVAL OFFICER PROCUREMENT

*Basic Test for all Applicants*  
Officer Qualification Test  
*Special Test for Officers for Directing Cargo  
Handlers*  
Officer Qualification Test—Form 10

###### IN RESERVE MIDSHIPMEN'S AND NAVAL TRAINING SCHOOLS AND NROTC UNITS

*Basic Test for all Trainees*  
Officer Classification Test  
*Tests Available for Use on Experimental Basis  
When Deemed Advisable by Interviewer*  
Biographical-Preference Inventory  
Officer Personal Inventory  
*Tests for Selection for Training as Radio  
Specialists*  
*Pre-Radar Battery*  
General Mathematics Test  
General Physics Test

*Test for Selection of Tactical Radar Officers*  
CIC Aptitude Test

###### AT OTHER ACTIVITIES

*Tests for Advanced Classification Purposes*  
*Naval Training Center (Miami)*  
Officer Classification Test  
Sonar Pitch Memory Test

*Pre-Commissioning Training Schools:*  
*NTSch (Destroyers), NOB, Norfolk;*  
*APA Pre-Commissioning Training*  
*Center, Seattle; CVE Pre-Commis-*  
*sioning Training Center, Bremerton*  
Officer Classification Test  
Officer Personal Inventory (on experi-  
mental basis)

*ComPhibTraLant and ComPhibTraPac*  
Officer Classification Test  
Officer Personal Inventory (on experi-  
mental basis)

\* In the development and evaluation of psychological tests and in the conduct of research, the Bureau of Naval Personnel has been materially assisted by a number of projects developed under the National Defense Research Committee.



# ENLISTED PERSONNEL

## AT RECRUITING AND PROCUREMENT OFFICES

### *Basic Tests for Men Applicants*

General Classification Test  
Radio Technician Selection Test

### *Test for Applicants for Women's Reserve (Enlisted)*

Enlisted Qualification Test

### *Tests for Selection of Combat Aircrewmembers*

General Classification Test  
Mechanical Comprehension Test  
Airplane Matching Test  
Radio Code Test  
Clerical Aptitude Test

## AT NAVAL TRAINING CENTERS

### *Basic Tests for all Recruits*

#### *Basic Test Battery*

General Classification Test  
Reading Test  
Arithmetical Reasoning Test  
Mechanical Aptitude Test  
Mechanical Knowledge Test (Mechanical)  
Mechanical Knowledge Test (Electrical)  
Clerical Aptitude Test  
Spelling Test  
Radio Code Test

### *Special Tests Given to Men Who Have Been*

#### *Screened by the Basic Test Battery*

Mechanical Comprehension Test  
Airplane Matching Test  
Radio Technician Selection Test  
Sonar Pitch Memory Test  
Literacy Test  
Non-Verbal Classification Test  
Winchmen and Hatchmen Selection Test  
Eye-Hand Coordination Test  
Enlisted Personal Inventory  
Pre-Radio Materiel Final Achievement Examination

## AT CLASSIFICATION CENTERS

### *Tests Available for Use at the Discretion of the Officer-in-Charge*

#### *Basic Test Battery*

General Classification Test

Reading Test  
Arithmetical Reasoning Test  
Mechanical Aptitude Test  
Mechanical Knowledge Test (Mechanical)  
Mechanical Knowledge Test (Electrical)  
Clerical Aptitude Test  
Spelling Test  
Radio Code Test

### *Basic Test Battery (Fleet Edition)*

General Classification Test  
Arithmetical Reasoning Test  
Mechanical Aptitude Test  
Mechanical Knowledge Test  
Electrical Knowledge Test  
Clerical Aptitude Test

### *Other Selection and Classification Tests*

Radio Technician Selection Test  
Non-Verbal Classification Test  
Literacy Test  
Winchmen and Hatchmen Selection Test  
Sonar Pitch Memory Test  
Digit Memory Span Test (Recorded discs)  
Auditory Test No. 3  
Sentences in Noise (Recorded discs)  
Auditory Test No. 8  
Speech Interview  
Enlisted Personal Inventory

ON SHIPS AND AT SHORE STATIONS WHERE  
LARGE SCALE TESTING PROGRAMS  
ARE NOT CARRIED OUT

### *Tests for Classification Purposes*

#### *Basic Test Battery (Fleet Edition)*

General Classification Test  
Arithmetical Reasoning Test  
Mechanical Aptitude Test  
Mechanical Knowledge Test  
Electrical Knowledge Test  
Clerical Aptitude Test



## ACHIEVEMENT EXAMINATIONS

*Used to Measure Achievement in Training*

### OFFICERS

#### EXAMINATIONS FOR RESERVE MIDSHIPMEN'S AND NAVAL TRAINING SCHOOLS

Reserve Midshipmen's Schools' (Deck)  
Standardized Examination  
Pre-Radar Final Achievement Examination  
CIC Final Achievement Examination

### ENLISTED PERSONNEL

#### EXAMINATION FOR NAVAL TRAINING CENTERS

Recruit Training Final Achievement Examination

#### EXAMINATIONS FOR NAVAL TRAINING SCHOOLS

Basic Engineering Final Achievement Examination  
Diesel Final Achievement Examination  
Diesel Performance Test  
Electrical Final Achievement Examination  
Fire Controlmen Final Achievement Examination  
Gunner's Mates Final Achievement Examination  
Gunner's Mates Final Achievement Examination—Directions for Administering and Scoring

Gunner's Mates Identification Tests  
Gunner's Mates Performance Tests  
Gyro Compass Final Achievement Examination  
Quartermasters Final Achievement Examination  
Radar Operators Final Achievement Examination  
Radio Final Achievement Examination  
Radio Materiel (Pre-Radio Materiel) Final Achievement Examination  
Radio Materiel (Elementary Electricity and Radio Materiel) Final Achievement Examination  
Signal Final Achievement Examination  
Signal Performance Tests  
Storekeepers Final Achievement Examination  
Torpedomen Final Achievement Examination  
Yeomen Final Achievement Examination

### OTHER ACHIEVEMENT EXAMINATIONS

Lookout Final Achievement Examination  
Spelling Achievement Examination  
Telephone Talker Final Achievement Examination  
Check List for Correct Handling of Sound-powered Telephone

## EXAMINATIONS FOR ADVANCEMENT IN RATING

*Used by Boards Examining Candidates for Advancement in Rating*

### SEAMAN, SPECIAL, AND COMMISSARY RATINGS

Fundamental Knowledge Required of all  
Men in the Navy  
Seaman, First Class  
Coxswains  
Boatswain's Mates  
Gunner's Mates  
Turret Captains  
Minemen  
Torpedoman's Mates

Quartermasters  
Signalmen  
Fire Controlmen  
Fire Controlmen O—(Operators)  
Yeomen  
Storekeepers  
Hospital Apprentice, First Class  
Pharmacist's Mates  
Ship's Cooks  
Bakers  
Chief Commissary Steward



# ARTIFICER RATINGS

Radiomen  
Radio Technicians  
Radarmen  
Sonarmen  
Carpenter's Mates  
Shipfitters  
Metalsmiths  
Fireman, First Class  
Machinist's Mates  
Machinist's Mates S—(Shop Machinists)  
Motor Machinist's Mates  
Electrician's Mates  
Water Tenders  
Boilermakers

Aviation Machinist's Mates H—(Aviation Hydraulic Mechanics)  
Aviation Machinist's Mates I—(Aviation Instrument Mechanics)  
Aviation Machinist's Mates P—(Aviation Propeller Mechanics)  
Aviation Electrician's Mates  
Aviation Radiomen  
Aviation Radio Technicians  
Aviation Metalsmiths  
Aviation Ordnancemen  
Aviation Fire Controlmen  
Aviation Ordnancemen T (Aviation Turret Mechanics)  
Parachute Riggers  
Photographer's Mates

# AVIATION RATINGS

Aviation Machinist's Mates  
Aviation Machinist's Mates C—(Aviation Carburetor Mechanics)  
Aviation Machinist's Mates F—(Aviation Flight Engineers)

# RATING SCALE FOR USE IN DETERMINING ADVANCEMENT IN RADIO TECHNICIAN RATING

## Radio Technician Rating Scale

The scope of research studies done on officer and enlisted personnel and training problems is shown in Chart III.

# TEST DEVELOPMENT

*Tests for Officer Personnel.* When men and women apply at Offices of Naval Officer Procurement for commissioning as officers, they are given one of three forms of the Officer Qualification Test. The test scores are used with the records of education and experience and the results of physical examinations in determining admission of these persons to the Navy. Following admission, officers and officer candidates receive indoctrinational training in Indoctrination Schools, Reserve Midshipmen's Schools, or Naval Reserve Officer Training Corps Units. Here aptitude tests are given and test scores are used along with other factors to select individuals for such special technical training as Bomb Disposal School, Armed Guard School, Mine Warfare, the tactical use of radar, the theory and techniques of electronics gear, the amphibious and submarine programs. The Officer Classification Test, developed for routine use in selecting officer personnel for technical training and in classifying them for duty, measures aptitudes in the following areas: verbal, mechanical, mathematical, and spatial.

Achievement examinations have been constructed to measure the accomplishment of trainees in three officer training programs: the training of deck officers in Reserve Midshipmen's School, the training of officers in the tactical use of radar, and the technical training of electronics engineers. Achievement examinations are also being developed for Naval Reserve Officer Training Corps Units.

*Tests for Enlisted Personnel.* Nearly 250 tests have been constructed for enlisted personnel. As can be seen from Chart II these tests are used:



1. at the recruiting level for qualification of enlisted personnel
2. in the recruit training programs for selection of enlisted personnel for Naval Training Schools
3. at classification centers for determining assignment to duty
4. in recruit training programs for the measurement of achievement
5. in Naval Training Schools for the measurement of achievement
6. on ships and shore stations for determining eligibility for advancement in ratings

*Tests for Qualification of Enlisted Personnel.* At present, most enlisted men are processed by Selective Service, but seventeen-year olds, who apply at Navy recruiting offices, are tested for general aptitude for naval duty. Also at the recruiting level, certain men are earmarked, in part on the basis of test scores, for special training as Radio Technician, Combat Aircrewman, and Hospital Corpsman.

A special test, the Enlisted Qualification Test, has been developed for use with applicants for enlistment in the Women's Reserve.

*Tests for Selection and Classification of Enlisted Personnel.* The first, and most extensively used, tests developed for enlisted personnel are those which comprise the Basic Test Battery (see Chart II). The first forms were developed early in 1943. Three standard forms and a Fleet Edition are now available. The tests of the basic battery are used in the recruit training programs to select enlisted personnel for technical training programs. Based on extensive research, cutting scores on one or more of these tests have been established for 46 enlisted training programs.

In addition to the Basic Test Battery, other tests have been developed to select enlisted personnel for specialized technical training programs. Among these are the Radio Technician Selection Test for selecting men for Radio Technician training, the Sonar Pitch Memory Test for selecting operators of underwater electronics gear, and the Literacy and Non-Verbal Tests used for identification of poor readers.

In addition to being used in selection of enlisted personnel for technical training, the Basic Test Battery and the supplementary tests are used extensively in programs for classifying enlisted personnel for assignment to duty.

*Achievement Examinations for Enlisted Personnel.* Achievement examinations have been developed (see Chart II) for the recruit training programs, for 14 types of enlisted Naval Training Schools, such as Fire Controlmen, Gunner's Mates, Torpedomen, Quartermasters, and for a number of special training programs. These examinations include standardized performance and identification tests as well as written examinations. The results of the achievement examinations are used not only in assigning the final school marks of trainees, but also to indicate the relative standing of different schools of the same type and the effectiveness of programs of instruction.

• *Advancement in Rating Examinations.* Three books of advancement in rating examination questions have been developed for use by the examining boards which determine in part the "rating" of an enlisted man in his specialty (e.g., Torpedoman, Machinist's Mate) and his advancement in pay grade within his rating. A pool of approximately 35,000 test items has been prepared for 47 Navy ratings, listed in Chart II. These sets of examinations will be revised as necessary.



## RESEARCH ON PERSONNEL AND TRAINING

To date the research program has centered around problems of selection for training programs and of classification for duty assignments. As can be seen in Chart III, studies on selection for a variety of officer and enlisted training programs have explored the relationship between selection standards, such as test scores, age, educational level, civilian occupational experience, and success in the training programs. Comparable studies have been done on classification procedures.

Some studies have been done on training problems, notably on the measurement of achievement in officer and enlisted Naval Training Schools. Underway at present are a series of information surveys to study the effectiveness of training programs, and a comprehensive program of validating selection, classification, and training procedures by determining the relationship between the qualifications of naval personnel and their job proficiency.

## AN INTEGRATED PROGRAM OF TEST DEVELOPMENT AND RESEARCH

All test construction and research on the selection and training of Radio Technicians are centered in the Radio Materiel Unit of the Section, thus facilitating the unified, comprehensive study of a training program which includes several levels of enlisted schools extending over an 11-month training program. The Radio Technician Selection Test has been developed for use in selecting men for this training, and achievement examinations have been developed for the first two schools: the Pre-Radio Materiel School, and the Elementary Electricity and Radio Materiel School. In addition to the preparation and validation of tests and examinations, research has been done to standardize the curricula, to measure the efficiency of teaching, and to effect other improvements in the training program. Corresponding to the Radio Technician Training Program for enlisted personnel is the program for training officers as electronics engineers. Tests have been developed to select officers for this training program and to measure the achievement in the first level of training, the Pre-Radar School. Test scores on this examination are also used to determine, in part, admission to the advanced Radar School. The tests developed and research done for this program are shown in Charts II and III, respectively.

## SERVICES OF THE TEST AND RESEARCH SECTION

In addition to the development of standardized tests and the conduct of over-all research, the Test and Research Section provides a variety of services to Navy establishments. Summaries of scores made on officer and enlisted aptitude tests provide information regarding the quality of applicants for commissions and the quality of recruits, both for different times of the year and for different regions of the country. Reports on grading systems and on test scoring accuracy are made periodically to enlisted training programs. Assistance has been given to instructors in training programs in the interpretation and use of test scores and in the development of tests. To meet the need for help with test construction, a manual, *Constructing and Using Achievement Tests*, has been developed and widely distributed. In the process of developing tests, assistance has been given to schools in the clarification of curricular objectives and of standards of performance. The technical competence of the personnel of the Section is available, upon request, to any Navy program.



# CHART III

## RESEARCH STUDIES ON NAVAL PERSONNEL AND TRAINING PROGRAMS

### RESEARCH ON SELECTION AND CLASSIFICATION

#### *Validation on Selection and Classification*

#### OFFICER TRAINING PROGRAMS

##### *Amphibious Training*

Validation of Officer Classification Test scores, Officer Personal Inventory scores, age, education and civilian occupational experience

##### *Destroyer Training*

Validation of Officer Classification Test scores, Officer Personal Inventory scores, age, education and civilian occupational experience

##### *Motor Torpedo Training*

Validation of Officer Classification Test scores, Officer Personal Inventory scores, age, education, civilian occupational experience, small boat experience

##### *Submarine Training*

Validation of Officer Classification Test scores, Officer Personal Inventory scores, age, education and civilian occupational experience

##### *Radio Specialists Training* (Electronics Engineers)

Validation of scores on Pre-Radar General Aptitude Test, General Mathematics Test, General Physics Test, and Officer Classification Test

##### *Tactical Radar Training*

Validation of scores on Relative Movement Test, Tactical Radar Test, CIC Aptitude Test, Officer Qualification Test, and of age and major field in college

##### *Training For Technical Aviation Billets* (Air Combat Intelligence, Air Navigation, Aviation Communication Training, Aviation Engineering)

Validation of Officer Classification Test scores, age, education, civilian occupational experience, and preference for duty

#### ENLISTED TRAINING PROGRAMS

##### IN NAVAL TRAINING SCHOOLS

##### *Aviation Branch Schools* (selected):

Aviation Machinist's Mates, Aviation Ordnancemen, Aviation Radiomen  
Validation of Basic Test Battery scores, age and education

##### *Bomb Disposal School*

Validation of Basic Test Battery scores and Enlisted Personal Inventory scores

##### *Electrical School*

Validation of Basic Test Battery scores, age and education

##### *Quartermaster School*

Validation of Basic Test Battery scores, age and education

##### *Radar Operators School*

Validation of Basic Test Battery scores, age and education

##### *Radio School*

Validation of scores on Basic Test Battery, and Radio Code Tests, and of age and education

##### *Signal School*

Validation of Basic Test Battery scores, age and education

#### IN OTHER TRAINING PROGRAMS

##### *Radarman Strikers for Destroyers and Fast Attack Transports*

Validation of Basic Test Battery scores and CIC Aptitude Test scores

##### *Radio Technician Training Program*

Validation of Basic Test Battery scores and Radio Technician Selection Test scores



*Validation of Tests for Selection for Training*

OFFICERS

*Officer Classification Test* for selection for Naval Training Schools

Communications, Diesel Engineering, Harbor Defense, Pre-Radar

Other Training Programs

Naval Reserve Midshipmen's School, Motor Torpedo Boat Repair Unit, Officers' Torpedo School, Ordnance and Gunnery Schools

ENLISTED PERSONNEL

*Basic Test Battery* for selection for Naval Training Schools

Aviation Machinist's Mates, Aviation Ordnancemen, Aviation Radiomen, Basic Engineering, Bomb Disposal, Cooks and Bakers, Diesel, Electrical, Fire Controlmen, Fire Control-Advanced, Gunner's Mates, Gunner's Mates' Electric Hydraulic, Hospital Corps, Machinist's Mates, Quartermasters, Radar Operators, Radio, Signal, Storekeepers, Torpedomen, Yeomen

*Validation of Classification Requirements*

OFFICERS

*Amphibious and Destroyer Billets*

Validation of Officer Classification Test scores, age, education and civilian occupational experience

ENLISTED PERSONNEL

*Submarine Billets*

Validation of scores on Basic Test Battery' Enlisted Personal Inventory, Otis Self-Administering Test of Mental Ability, and of age and rank in Naval Training School Class

*Other Studies on Procedures for Selection and Classification*

OFFICERS

Prediction of success in a Naval Reserve Midshipmen's School

Comparison of Officer Classification Test scores of men in different Indoctrination and Naval Reserve Midshipmen's Schools

Selection of officers for post graduate course in Torpedo Data Computer Operation in Submarine School

Evaluation of *Report of Fitness of Officers* for use as a criterion of success

ENLISTED PERSONNEL

Methods of assigning school quotas

Relation between recommended and actual recruit assignments to Naval Training Schools

Reliability of interviewers' judgment in recommending school assignments

Use of additive scores for selection for training

Evaluation of Basic Test Battery for selection, against grades made on achievement examinations for Naval Training Schools (Diesel) and (Electrical)

Comparison of men selected at Recruiting Stations with men selected at Naval Training Centers for the Radio Technician Training Programs

Analysis of Ortho-Rater scores of experienced gunners



## RESEARCH ON PROBLEMS OF TRAINING

### MEASUREMENT OF ACHIEVEMENT

Analyses of differences and variability in Naval Training School grades

Use of ratings in measurement of achievement

Analysis of marks in a Naval Reserve Midshipmen's School

Comparative evaluations of Naval Training Schools: for officers (Pre-Radar) and for enlisted personnel (Elementary Electricity and Radio Materiel)

Achievement in Naval Training Schools (Tactical Radar)

Comparison of scores on Electrical Final Achievement Examination by groups entering and groups ready to graduate from Naval Training Schools (Electrical)

### STUDIES ON CURRICULA

Analysis of mathematical concepts in Naval Training School (Radio Materiel)

Comparison between graduates of long and short courses at Naval Training School (Tactical Radar)

### STUDIES ON ATTRITION

Attrition in the Radio Technician Training Program

Causes of failure in Naval Training School (Radio)

### OTHER STUDIES ON TRAINING

Questionnaire survey of what the enlisted man thinks about Navy training

Prediction of teacher competence in the Radio Technician Training Program

## SUMMARY STATISTICS

### OFFICERS

#### *Officer Qualification Test*

Population differences by Naval Districts

Differences in scores for men and women

Trends in test scores

#### *Officer Classification Test*

Scores for various Indoctrination and Naval Reserve Midshipmen's Schools

### ENLISTED PERSONNEL

#### *Basic Test Battery*

Scores made by recruits at Naval Training Centers

Trends in test scores

Test score patterns of recruits recommended for school assignment

Test score patterns of school graduates

#### *Radio Technician Selection Test*

Trends in test scores

Highest school grade completed by enlisted men—white and negro

Studies on test scoring accuracy

## SUMMARY

Since November 1942, fourteen tests have been developed or approved for various officer programs. More than 250 tests have been constructed for use with enlisted personnel. Research studies have been carried out for 19 officer and 27 enlisted activities. The emphasis in all projects has been upon test construction and research which will facilitate the admission of well-qualified persons to the Navy, the effective placement and utilization of personnel, and the development of more adequate training programs.

Forthcoming reports will describe the construction and use of some of the tests produced by the Test and Research Section and some of the major research activities. Among these reports will be:

- a. Development of the Basic Test Battery for Enlisted Personnel
- b. Construction and Use of Achievement Examinations for Navy Schools
- c. Research in the Radio Technician Training Program
- d. Research on Officer Qualification, Selection, Classification, and Training



# PERSONNEL RESEARCH SECTION, THE ADJUTANT GENERAL'S OFFICE: DEVELOPMENT & CURRENT STATUS

STAFF, PERSONNEL RESEARCH SECTION, CLASSIFICATION AND  
REPLACEMENT BRANCH, THE ADJUTANT GENERAL'S OFFICE

## INTRODUCTION

In February 1943, an article published in this journal surveyed the background, organization, and field of responsibility of the Personnel Research Section, Classification and Replacement Branch, The Adjutant General's Office, War Department (1). Since that time, major developments in the responsibilities of the section and consequent major changes in its organization have occurred.

The mission with which the Personnel Research Section is charged has not changed. In November 1943, the functions of the Adjutant General in respect to personnel research were stated in War Department Circular No. 312, which says in part:

"2. The establishment and control of Army-wide policies and procedures governing the classification, testing, selection, assignment, and reassignment of commissioned, warrant, enlisted, and Women's Army Corps personnel are functions of the War Department.

"3. The Adjutant General is designated the War Department operating agency for these functions and is charged with—

a. Preparation of regulations, memorandums, and releases on personnel classification, testing, selection, assignment, and reassignment procedures within established policies.

b. Development, construction, validation, and standardization of all personnel screening tests and interview techniques for the Army. . . ."

To the Personnel Research Section, as the operating agency of The Adjutant General, has been delegated the specific responsibility for the "development, construction, validation, and standardization of all personnel screening tests and interview techniques for the Army." The only exception to this statement of responsibilities is that the development of techniques to select the Flight Crews of the Army Air Forces is a function of the Air Surgeon.

During the period reported upon previously, the section was concentrating its efforts primarily on problems of initial classification and of selection for specialist training. Circumstances permitted the staff to work as a group on these tasks, specializing according to the type of work done—test construction, editing, statistics—rather than according to the type of problem. Essentially the office was organized into a Test Development and Analysis Subsection (including Test Development and Statistical Analysis Units) and a Test Service Subsection. Field work was conducted both by members of these subsections and by a special Field Studies Subsection (1).

With an increase in the variety of problems and an expansion of work, organizational changes became necessary for efficient operation. It was no longer possible for the staff to work as a group on any one problem—too many different problems had to be carried forward simultaneously. Moreover, since the new problems were increasingly specialized, it became necessary for personnel to be thoroughly familiar with one particular field of military personnel work.



## NEW PROBLEMS ARISING IN 1943

The work grew, first of all, because of the continual efforts of the section to improve its techniques. In the reception-center program, the Army General Classification Test, while of proved value, was not regarded as a completely satisfactory test, since it yielded only one over-all score when in many cases selection depended on such distinct abilities as facility in arithmetic computation or comprehension of written instructions. Plans were made and work begun on a test or battery of tests designed to yield not only a general estimate of a soldier's ability but also as many as eight separate scores. At the present time, the Army General Classification Test 3a has been authorized for Army-wide use. This test yields a score for each of the four skills—reading, arithmetic computation, arithmetic reasoning, and pattern analysis—involved as well as an over-all score for general ability equivalent to the one obtained from Army General Classification Test 1a, 1b, 1c, or 1d. Work is going forward on three alternate forms, 3b, 3c, and 3d, as well as on supplementary tests of information about shop, automotive, radio, and electrical mechanics.

Another major change in the reception-center testing program has already been made. The Radiotelegraph Operator Aptitude Test, ROA-1, X-1 (2), was replaced in August 1944 by the Army Radio Code Aptitude Test, ARC-1, ROA-1, X-1. The new test, ARC-1, is the Speed of Response Test developed in collaboration with the National Defense Research Committee. ROA and ARC differ in kind: the former is a discrimination test, requiring the subject to identify two sound patterns as the same or different; the latter is a learning test, in which the subject learns three letters in International Morse Code and is then tested on his knowledge of them.

Besides refining the means of initial classification, the Personnel Research Section expanded its work on the selection of men for specialist schools at Re-Training Centers of the Army Air Forces. A study of the validity of practical performance tests as predictors of success in the Air Forces Technical Schools resulted in the installation of a battery of paper-and-pencil as well as performance tests to select students. This battery replaced some 25 locally constructed performance tests, largely unvalidated and unstandardized. Other typical problems investigated were the selection of aircraft warning specialists, the grading system in Army Air Forces specialist schools, and the selection of men who could skip one part of their training as automotive mechanics at Ordnance schools. In the spring of 1945 the office turned its attention to a new problem in specialist training. With considerable numbers of men returning from overseas for reassignment, it has become necessary to find out exactly how well they know their military specialties so that those ready for reassignment can be assigned immediately while others can be given refresher training and still others completely retrained.

Projects which represented new phases of work were also begun. In July 1942 the first induction station program to eliminate men unlikely to learn the duties of a soldier was installed. A set of screening tests was put into operation while work was started immediately on a large-scale study of the value of some thirty tests designed for use with men of limited education and/or ability. This study included development of adequate criteria of soldier performance, trial of some thirty tests, selection of the best tests, standardization and validation of the ones selected, checks on these tests in operation, and construction of alternate forms. This project has also led to other research concerned with the problems of individual testing and of testing low-grade men (3).



The establishment of the Army Specialized Training Program in December 1942 brought a request to The Adjutant General to construct selection tests and national achievement tests in college subjects. The one hundred fifty-odd tests constructed represent what is probably the largest single objective-testing program in the college field.

Nor were these the only trends and new projects which the section faced early in 1943. The problem of separating soldiers from the Army was early recognized as a point at which classification could and should function. Separation counseling provides an opportunity to help the soldier assess what he has learned in the Army and to give him educational and vocational guidance. Procedures, including tests and information on the relation of Army tests to civilian jobs, were needed. In 1944 enough soldiers were being discharged from the Army to warrant the initiation of separation classification procedures. Work is in progress on projects related to tests for this program: at the present time, the relation between the Army tests most widely used (such as the AGCT) and several commercial tests used in industrial situations is being studied to provide information about the probable meaning of Army tests in relation to civilian jobs; work also goes forward on a battery of tests especially designed for use in separation counseling.

In addition, the section was directed to develop devices and procedures for the classification, assignment, and promotion of civilian personnel working for Army Service Forces. It seemed reasonable to apply the same general type of methods used to classify soldiers to the more than one million civilian employees of the ASF, many of whom hold jobs similar to those of soldiers and who in many cases work alongside them. This large-scale program has involved both the construction of needed tests and other personnel devices and the maintenance of a field service to assist in establishing personnel testing programs.

#### ORGANIZATION 1943-44\*

In response to these varied demands, the present organization of the Personnel Research Section evolved. The most immediate pressure at the beginning of 1943 was to produce the selection and achievement tests necessary for the Army Specialized Training Program. Not only was a far larger permanent staff needed but also consultants in a wide variety of subjects—in chemistry, engineering drawing, English, geography, history, languages, personnel psychology, physics, surveying, and other college fields. For a variety of reasons, including the need to obtain personnel, the section moved to New York City on June 1, 1943. Overcrowded conditions in Washington had made it almost impossible to recruit full-time personnel, and the supply of qualified consultants in college fields was far greater in New York than in Washington because of the larger number of colleges and universities in the metropolitan area.

\* Besides persons mentioned in this article, the following military and professional personnel were members of the Personnel Research Section in the period 1942-44 but are not at present working for the section: Capt. Russell Leiter; Lts. Charles L. Christiernin, David L. Golan, Winslow N. Hallett, Lloyd Lofquist, and Philip Nogge; Drs. Kenneth E. Clark, Herman A. Copeland, Walter N. Durost, Solomon D. Evans, Wells Harrington, Donald M. Johnson, Philip M. Kitay, William C. Kvaraceus, Adam Poruben, Jr., James T. Russell, Otis C. Trimble, Edgar P. Virene, and J. L. Wallen; Miss Jane M. Allison, Mr. Vernon E. Clark, Mr. Earle A. Cleveland, Mrs. Helen C. Dondy, Mrs. Hilda F. Dunlap, Miss Marion B. Eller, Mrs. Margaret Norgaard, Mr. Watson O. Pierce, and Mrs. Barbara M. Quiat.



In December 1943, approximately 150,000 students were tested with the AST achievement tests, and test construction for this program was at its height. Figure 1 shows the organization of the office at that time. Since it seemed wise to designate the whole New York installation as a section and since other functions of the Branch were also transferred to New York, what had been called the Personnel Research Section was now called the Personnel Research Subsection. It was organized into four units, divided according to the field of testing for which each was responsible: Military Classification Unit, general tests for Army-wide use; Technical Classification Unit, tests for the selection of special-

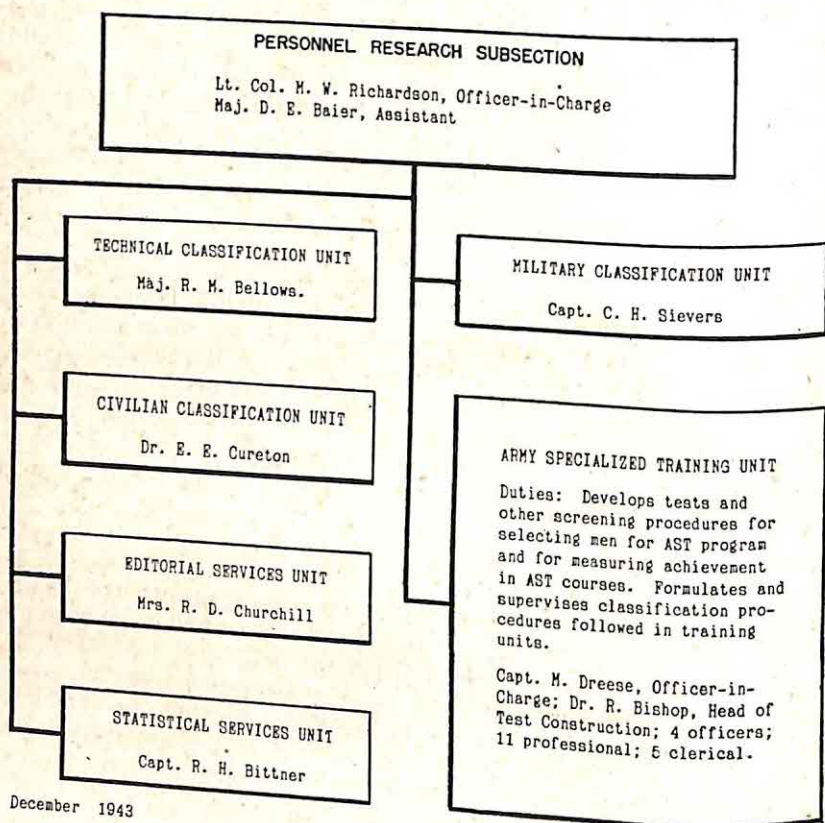


FIGURE 1. ORGANIZATION OF PERSONNEL RESEARCH SUBSECTION.

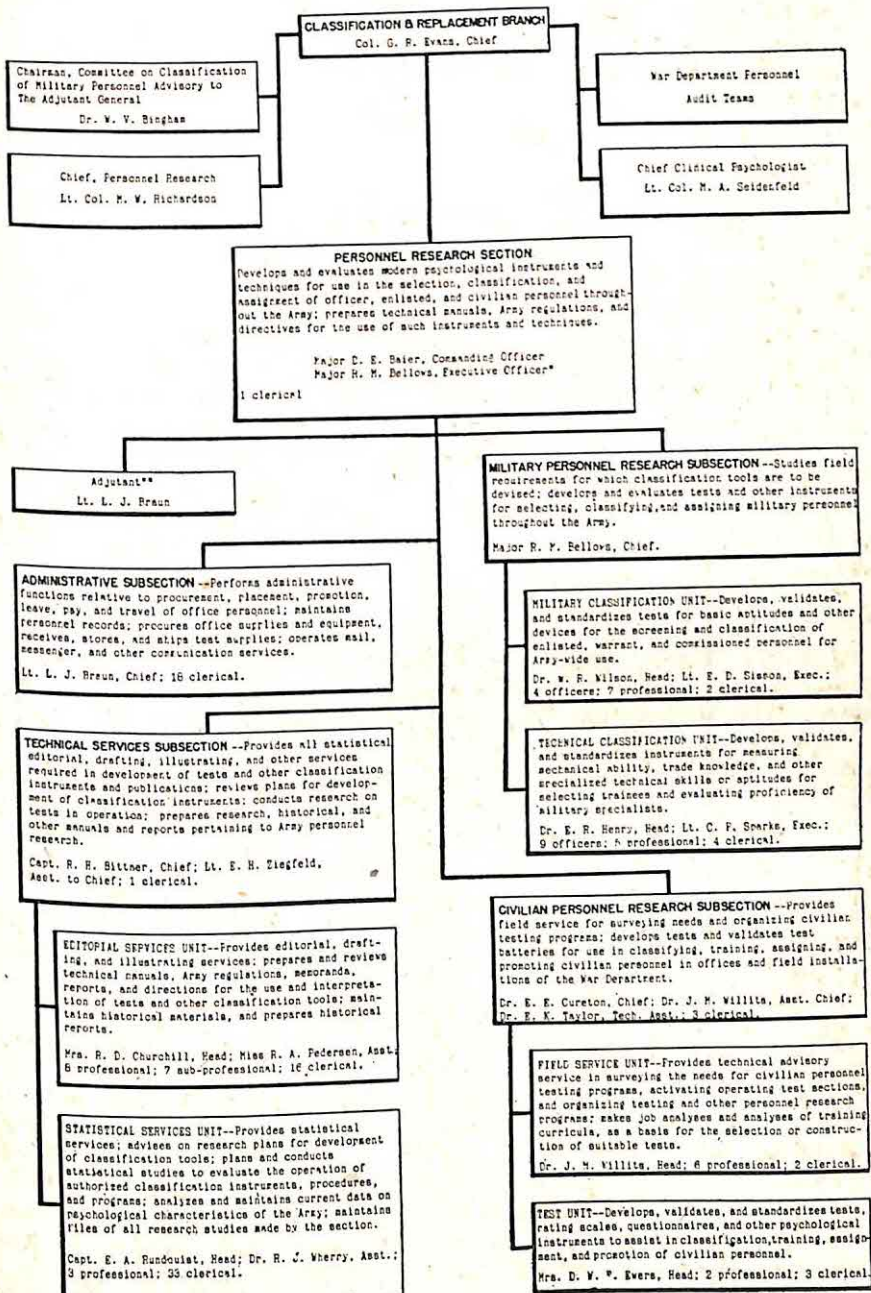
ists; Army Specialized Training Unit, tests for the ASTP; and Civilian Classification Unit, tests for War Department civilian employees. In addition, there were two service units—Editorial and Statistical.

The Army Specialized Training Unit, the organization of which is given in detail in Figure 1, had two functions: supervision of classification procedures at AST training units and development of tests for selection for the ASTP and for measuring achievement in AST courses. Capt. Mitchell Dreese, Officer-in-Charge of the Unit, headed the field program. The other members of the field staff were Capt. James V. Shea and Lts. Albert H. Berg, John F. Scott, and Ralph J. Strom. Dr. Ruth Bishop was head of test construction staff, which



# THE ADJUTANT GENERAL'S OFFICE

## Operations and Training Division



1 February 1945

\*The Executive Officer also functions as Chief, Military Personnel Research Subsection.

\*\*The Adjutant also functions as Chief, Administrative Subsection.

FIGURE 2. ORGANIZATION OF CLASSIFICATION AND REPLACEMENT BRANCH.



included Drs. Robert F. Earhart, Evelyn Raskin, James D. Teller, Robert M. W. Travers, and Arnold R. Verduin; Miss Emma E. Brown, Miss Bernice Orshansky, and Mr. Charles W. Collins. Mrs. Jeanne C. Davis handled statistical work for the program, and Mrs. Nannie Mae Williams and Miss Mary Jarrett did administrative work. In addition to this full-time staff, there were approximately forty consultants specializing in various college subjects. These consultants not only advised and reviewed the work of test technicians but in many cases themselves became experts in test construction in their own fields of specialization.

In March 1944, the Army Specialized Training Program became a reserve program. The construction of new tests came virtually to a halt; the unit was disbanded 1 December 1944, and its personnel assigned to other projects.

### PRESENT ORGANIZATION

The present organization of the office, shown in Figure 2, is a further development of the trend to specialization manifest in December 1943. Since the Personnel Research Section is now the only Classification and Replacement Branch installation in New York, it has again been designated a section with an Administrative Subsection to perform the necessary operating tasks. Lt. Col. Marion W. Richardson is now Chief of Personnel Research at branch level. Major Donald E. Baier is Commanding Officer of the New York installation with Major Roger M. Bellows as Executive Officer. The technical work of the office is now divided among three subsections: Military Personnel Research, Civilian Personnel Research, and Technical Services.

The Military Personnel Research Subsection, headed by Major Bellows, is charged with developing tests and other psychological instruments for Army personnel. The Military Classification Unit of this subsection deals with the basic, Army-wide problems. At the present time, it is occupied with such projects as the new Army General Classification Test 3a; alternate forms of the induction station tests; a battery of placement and achievement tests for use in Special Training Units; and an evaluation of the Army Individual Test, AIT-1, for use in clinical diagnosis. It is also concerned with the problem of constructing suitable selection tests for West Point. This unit is headed by Dr. William R. Wilson, with Lt. E. Donald Sisson as executive officer. Serving as field staff, test constructors, and statisticians are Lts. Fred C. Ford, David R. Krathwohl, Thornton C. Karlowski, and Keith L. Broman; Drs. Richard H. Paynter, G. Hamilton Crook, Hubert E. Brogden, and Hyman Brandt; Miss Charlotte M. Panimon, Mrs. Janet B. Schwinger, and Mr. Charles W. Collins.\*

The Technical Classification Unit of the Military Personnel Research Subsection, headed by Dr. Edwin R. Henry, with Lt. C. Paul Sparks as executive, is at the present time engaged in such specialized and technical problems as the development of tests of night vision, the development of tests for placement in military occupational specialties and of knowledge of basic military training, and the installation of classification tests and related materials in convalescent hospitals and rehabilitation centers. The staff of this unit consists of Lts. Carl

\* The list is confined to full-time professional and military personnel of all units. Thanks are due to many part-time technical experts and consultants. Clerical and sub-professional personnel, performing highly technical services, have contributed vitally to these operations.



L. Anderson, Albert H. Berg, Horace H. Corbin, Norman I. Greenfield, James M. Lynch, John F. Scott, Joseph L. Speicher, Calvin W. Taylor, and Louis P. Willemin; Drs. Robert F. Earhart and Robert M. W. Travers; Mr. Frank P. Cassens, Mr. Gordon L. Macdonald, and Mr. Belford B. Nelson.

The responsibilities of the Civilian Personnel Research Subsection in relation to civilian personnel differ from those of the Military Personnel Research Section in regard to the Army. There is no over-all plan for the testing of civilian personnel as there is for military. Instead these problems are handled locally; the Civilian Personnel Research Subsection, through the Industrial Personnel Division of Headquarters, ASF, aids the local installations in establishing and maintaining personnel testing units and provides standardized and validated tests and procedures needed in the field. This subsection is headed by Dr. Edward E. Cureton with Dr. John M. Willits as assistant chief and Dr. Erwin K. Taylor as technical assistant. The Field Service Unit of this subsection, which is at present assisting several installations in establishing programs for classifying civilian personnel, is headed by Dr. Willits and includes on its staff Drs. Raymond A. Katzell, Grace E. Manson, Philip M. Stone, and James D. Teller; Mr. Prentice Reeves, and Mr. Manual M. Cynamon. The other unit of the subsection is the Test Unit; Mrs. Dorothea W. F. Ewers is head with Miss Edith Cummins and Mrs. Celia M. Klinger as staff. This unit is developing such tests as a mechanical battery, a clerical battery, and a non-verbal test as a low-level intelligence test for such jobs as ammunition handlers and warehouse laborers. This subsection also handles one problem concerned with military personnel: the construction of tests for use in separation classification, the point at which Army and civilian classification meet. At the time when the soldier is separated from the Army, the separation counselor can help him by interpreting the knowledge the Army has of his aptitudes and abilities in the light of the civilian opportunities ahead of him. Since Army tests and procedures have been evaluated solely in military terms heretofore, it is necessary both to construct new tests as the Civilian Personnel Research Subsection is doing and to reinterpret Army tests in relation to widely used commercial tests and to civilian jobs as the Technical Services Subsection is doing.

The largest subsection is Technical Services, which provides a wide variety of statistical and editorial services to all other elements of the section. These include editing of tests and reports, preparing copy for the printer, providing computational and statistical facilities (including an IBM installation), and advising in the planning of statistical studies. In addition, this subsection has a number of projects of its own. Captain Reign H. Bittner is chief of this subsection with Lt. Ernest H. Ziegfeld as technical assistant. The units are Statistical Services, of which Captain Edward A. Rundquist is head, with Dr. Robert J. Wherry as assistant and with a staff including Drs. Read D. Tuddenham, Naomi S. Stewart, and Mr. Robert E. Breden; and Editorial Services, having Mrs. Ruth D. Churchill as head with Miss Ruth A. Pedersen as assistant and a staff made up of Dr. Evelyn Raskin; Miss Emma E. Brown, Mrs. Jane L. Eastman, Miss Betty B. Himmelman, Mrs. Charlotte G. Honig, Miss Marilyn R. Mendley, Miss Bernice Orshansky, and Mrs. Lillian E. Troll. In addition to the various statistical duties, the Statistical Services Unit carries on such projects as monthly analyses of the Army General Classification Test distributions of men processed at Reception Centers, follow-up validity studies of Army tests and other classification procedures, a study of the relationship between civilian occupations and AGCT scores, and operational statistics on the Army



Specialized Training Program. Typical projects of the Editorial Services Unit are the preparation of a manual of statistical data on Army tests, giving means, standard deviations, reliability coefficients, and correlations with a wide variety of variables for these tests as given to various Army groups; the revision of TM 12-260, *Personnel Classification Tests*, a technical manual instructing Army personnel in the theory and use of Army tests; and the preparation of a history of the problems and the work of the Personnel Research Section.

### CONCLUSION

This article has summarized the evolution of the Personnel Research Section during the past two years. The major new task of the section at the present time is to devise scientific personnel procedures for selecting officers to be retained in the peacetime Army. Although this project, undertaken by direction of the General Staff, is so large that it cuts across all organizational lines, it has not made any permanent changes in the structure and function of the section. While the future cannot be predicted, at every stage of war, personnel problems demanding research for adequate solution have arisen; this trend may be expected to continue in the peacetime Army.

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# APPLICATIONS OF PSYCHOLOGY IN THE AMERICAN ARMY

THOMAS W. HARRELL

*University of Illinois\**

Psychology will be discussed herein under the topics of personnel classification and selection, training, leadership, conditions and methods of work, and morale. In varying degrees each of these topics has been studied and applied in the American Army. A number of articles have been published in the psychological journals pointing out contributions to the war effort. Unlike the critical attitude that is usually present both in psychological articles and reviews, the literature of military psychology is surprisingly sweet in its absence of criticism. There has been a shortage of internal criticism within professional writing to point out the limitations of studies reported and their possibilities under different situations. This sweetness within the journals is at considerable variance with verbal comments of both psychologists and army officers.

The explanation of this optimism within our journals may be merely another symptom of a national failing. Our press likes to tell us that our guns are better than the enemy even when they are not, that our soldiers are smarter than the enemy when that is doubtful; that our soldiers are more courageous than the enemy whose lack of surrender is due to an enigmatic fanaticism. Why then are we winning? The main reason seems to be that our side has tremendously more guns, planes, ships, tanks, and soldiers.

It is the thesis of this paper that because of shortcomings in organization and in personnel the contributions of Army psychology have not been nearly so great as is possible. Some of these shortcomings are internal to psychology as a profession; others are failures to educate and indoctrinate army officials into the implications of psychology for Army administration. Since one of the purposes of a war is to prepare for the next one, an attempt will be made to point the way to obtaining more accurate knowledge of soldier's behavior and to perfecting military methods of dealing with soldiers.

There has been no organization for bringing about a comprehensive American Army psychology. Two national committees have broad responsibilities with respect to American Army psychology. The National Research Council Committee on the Classification of Military Personnel Advisory to The Adjutant General is limited in function practically as shown by its title. It is concerned almost entirely with classification and only with classification as pertains to The Adjutant General which does not include the important specialists comprising air crews. On a few occasions this committee has advised on problems of training and leadership. The National Defense Research Committee has worked with and for the army on a number of research projects. The work of this committee has largely been confidential or secret. It is known that its charter is not one including research on all important phases of Army psychology. In addition to the functions of these two committees there are important Army psychological problems that have had no professional leadership on a national scale.

The area where psychology has done the most in the American Army is in personnel classification and selection. Before discussing the classification of

\* On leave 1940—; Major, Air Corps, Director, Manning Section, A-1 Division, Hq. 15th Air Force.



persons it is appropriate to discuss the classification of jobs into which and for which individuals are classified.

Shartle and his associates began before the passage of the Selective Service law a job analysis of each enlisted man's job. One purpose of the military authorities who initiated the study was to determine a fair schedule for grades and pay. Job descriptions based on careful job analyses are obviously also valuable as a guide to training as well as providing the framework for the classification of soldiers.

The analysis of enlisted men's jobs was made under peace time conditions whereas during war many of these jobs changed. The job analysts and their supervisors were experienced in civilian industry but knew little of the Army. Failure to follow the familiar terminology and the actual Army organization of jobs resulted. The job analysis for enlisted men did lead, however, to much improvement in job descriptions which were published as Army Regulations. (Officer jobs were not analyzed as early as were those for enlisted men. The Adjutant General's Office later published a set of equally detailed job descriptions for officers based on some job analysis.)

Specification Serial Numbers for Military Occupational Specialties are very widely used but are often a headache to Army officers because of the lack of a clear and uniform policy as to what is a job and because of so many unnecessary changes in the job classification. New jobs necessarily arise and jobs merge because of changes in methods or conditions. Many changes, however, were made because of lack of a definite policy. It is the current fashion to have fewer job classifications than formerly because of pressure to simplify the system. This is perhaps a good thing but has the obvious disadvantage of preventing certain refinements. Officer jobs have a meaningful numerical code structure wherein each digit from left to right has a more specific connotation. Such a system, similar to that used in the Dictionary of Occupational Titles, can be used flexibly and simply even where an extremely large number of jobs are shown. That is to say, one can deal only in three digit codes if four digits are too complex for the purpose, or one can deal even in two digits. The numerical code structure for enlisted men is almost meaningless. There was a lack of foresighted planning.

Classification of soldiers goes on in Selective Service, induction stations, reception centers, replacement training centers, training units, replacement units, and in combat units.

Selective Service has done nothing to select the particular men at a particular time the Army needed in terms of vocational skills or vocational aptitudes. For example, in the explosive growth of the Army Air Forces shortly after Selective Service began operating, a high percent of men entered the AAF as compared to the number entering the Infantry. Many young physically capable men with no skill for clerical work or for semi-skilled mechanics or as technicians were put in the AAF. Later when the AAF began to reach its troop basis, which occurred earlier than the saturation of the Infantry according to plan, the Infantry had to absorb many older and less physically qualified men whom it could not efficiently use. It needed many of the young men in the AAF but could not get them because then they had had a year or more of training and experience. To take them would have been to disrupt the AAF. Similarly in the case of officers young physically strong men with no talents peculiar to the needs of the AAF were put on desk jobs. Later the Infantry needed them just as it needed the young physically qualified enlisted men. In-



stead the Infantry got many older men and men with less physical endurance who would have served the AAF equally as well as the younger men.

In induction stations attempts were made to exclude illiterates and feeble-minded. The standards have fluctuated considerably. These fluctuations could be laid to shifting supply and demand although there is again a question as to the foresight in the personnel plan.

At reception centers men are classified according to their civilian experience which is useful to the Army. They are given classification and aptitude tests to determine their capacity for mastering Army specialist courses of training. The important decision as to which arm or service will train the man is made in the reception center. A later change in arm or service is infrequent and is almost completely barred insofar as the interest expressed by the enlisted man is concerned. Determination of arm or service is supposed to be made according to the qualifications of the soldier and the needs of the Army. In many cases a quota system stresses the needs of the Army and overlooks the qualifications of the man. Thousands of cases are present where men in the AAF would be more useful to the Infantry and an equal number of cases in the Infantry would be of more use to the AAF. More branch malassignments have been corrected toward the AAF than towards any other branch because of men's preferences. Since approximately 80% of all men in the Army prefer the AAF because of its more comfortable living conditions, higher pay, and glamor, there have been many requests initiated by the individual to transfer to the AAF. In hundreds of cases where the request was supported by a skill useful to the AAF the transfer has been made. Very rare are requests to transfer to the Infantry as a rifleman or combat Lieutenant.

The Army Ground Force has not obtained its fair share of intelligence. It did not get the number of men with high GCT (Army General Classification Test) scores to yield enough smart non-commissioned officers. It did not receive enough bright men with leadership to receive the available battlefield commissions. It did not get these bright men because the AAF got them first. Even between wars, the AAF used an intelligence test to select its men. The results showed that airplane mechanics and other aviation technicians learned faster who had high Army Alpha test scores. Similar results would have been obtained in the Infantry or in any other branch had the test been given and compared with training records. (No results are available comparing GCT scores for Infantry and AAF officers). The AAF, even after filling all of its technical jobs, has an embarrassing abundance of men superior in GCT who are doing routine duties as drivers, laborers, airplane handlers, etc. In a large sample 10% of AAF men in the lowest skilled job, laborer, scored in grades I and II GCT. At the same time the Infantry needed such men to become non-commissioned officers.

In Replacement Training Centers or Basic Training Centers, as they are called in the AAF, the classification of personnel continues. There the decision is made as to the specific type of training or duty to which the soldier will be assigned. As in Reception Centers the quota system continues to exert its evil influence. Regardless of a soldier's qualifications to become a clerk, if this week's quota calls for a mechanic he will be trained as a mechanic. Next week's quota for clerks may go unfilled. The soldier may have no interest in mechanical work and little aptitude for it. To match abilities and quotas in an efficient way would have required considerable planning and organization. No program was attempted along this line to exploit the total Army-wide possibilities.



A number of psychological tests are administered in Reception, Replacement and Basic Training Centers. Up to June 1942, there had been constructed for use four alternate forms of the Army General Classification Test, three alternate forms of the Army General Mechanical Aptitude Test and two alternate forms of the Clerical Aptitude Test. The United States Employment Service permitted the use of its large number of oral trade tests which had been validated in civilian industry. Some study had been made of the validity of the Signal Corps Code Aptitude Test later adopted for use as the Radio Operator Aptitude Test. Except for a new radio code test there was no major revision of psychological tests, at least up to the summer of 1944, although consideration had been given to the use of a basic classification test battery as a possible substitute for the GCT, MA and CA. The tests used have a satisfactory reliability with the possible exception of the Radio Operator Aptitude Test which was replaced. The validity of the GCT is perhaps as high as can be expected from a 40 minute test of its type. The validity of MA is little greater than GCT in predicting success in mechanical training. There is too much overlap between the GCT and MA.

Personnel classification continues in training units in the United States by upgrading those who succeed and by reassigning those who fail. In general there has been too much upgrading of both officers and enlisted men and not enough downgrading. People are promoted not because they are the best available but because a position vacancy for a higher grade is immediately present. In spite of bales of paper giving instructions and forms, the spirit of promotion for merit has not thoroughly permeated Army procedure.

Classification in units for sending men overseas produced some difficulty. It has always been written policy to send the best men overseas. Training units, especially in the early months of the war, committed classification crimes in sending unqualified personnel overseas. This selfishness, though understandable and widely prevalent in the Army, is sometimes inefficient. The malevolent quota system again contributed to this source of classification error. If 10 radar mechanics were requested, but 10 were not available the unit replied to that effect. It was instructed to yield them even though they were not available. It then performed a shotgun reclassification rather than do the more sanitary act of sending clearly indicated next best substitute classifications but leaving the classifications honest.

Classification continues in overseas Replacement Depots in the United States where men are processed for movement as replacements to overseas units. Aside from a few early abuses, little of note in classification is performed in these depots save correcting occasional errors and bringing records up to date.

From depots in the United States personnel are shipped to replacement units overseas where again some classification changes are made. No changes should be necessary except to correct errors. There have been instances, however, where men without proper training have been reclassified to meet quota requirements. By analogy if someone ordered a can of peaches, a grocer who substituted pears and put a peach label on the can would not be popular. An Army officer who authorizes a grossly inaccurate reclassification is equally dishonest as the grocer. One explanation as to why such personnel finagling is so much more prevalent than mislabeling peaches or other supplies is the less exact nature of personnel functions as compared to supply and matériel. This inexactness leads slick operators into temptation. In turn these devious devices contribute to keeping personnel procedures in the twilight of accuracy.



In combat units one of the classification problems that first assumed importance is that soldiers become unfit for full combat duty as a result of wounds or other disability. In many instances the soldier can perform a service job in a rear echelon, such as working as a clerk or driving a truck. Soldiers who can perform only in jobs not requiring the stamina and strength called for in combat are classified as "limited service" or "limited assignment." There have been some confusing shifts in policy with respect to limited assignment men. In one theater, for example, many limited assignment men were being tried on the job and many were succeeding. Before their trial period was completed it was decided to send all of them, regardless of suitability for the job on which being tried, to the United States which is the fondest goal of every soldier overseas. In other instances failures on the job were returned to the United States whereas those who succeeded were kept overseas. Similarly a policy for the rotation of personnel was supposed to reward persons who had performed successfully over a long period of time by returning them to the United States for an assignment in the Zone of the Interior. As it turned out rotation is often used to return officers who are not quite incompetent enough to be reclassified as unsatisfactory. Enlisted men, similarly, are returned on rotation not according to the spirit of the policy, but to get rid of clunks. In sum, contrary to the written policy, soldiers are punished by banishment from the United States when they succeed and are rewarded by return when they fail. Such psychology in reverse will add business for mental hygienists.

As men arrive back into the United States additional classification problems arise. Considerable dead wood arrives. Returned men may be heroes or may be clunks. Whether hero or clunk, can not be distinguished because of the lack of forthrightness and understanding in the rating of their competence and skill. In the redistribution stations which receive the personnel from overseas and distribute them the policies appear to be sound and the personnel technicians conscientious. A number of errors in classification and assignment have been reported because of a lack of military knowledge of jobs and personnel qualifications therefor. On the other hand, Army jobs are so varied and complex that few persons could have any more than superficial knowledge concerning all jobs. The need has been recognized, but not thoroughly exploited, to place in redistribution stations not only personnel technicians, but also specialists in each important job family who are acquainted with the actual details of jobs.

Classification, which has utilized the services of far more psychologists than any other phase of Army work, is shown to have a number of shortcomings. The major shortcomings can be generalized as (1) quotas which force men into jobs for which other men at a slightly different time or place are better fitted; (2) lack of understanding on the part of psychologists as to details of military jobs and organization and lack of understanding on the part of Army officials to possibilities and limitations of vocational psychology.

Specialized training is given in many Army jobs where the tasks cannot be learned satisfactorily on the job or where sufficient persons are not available from civilian life possessing the desired skills. The organization of training is largely in terms of specific jobs, the classification of which is mentioned above. Considering the large number of apparently important psychological problems which are a part of Army training a surprisingly small number of psychologists have been at work in this area. Psychologists have written a manual on how to teach instructors to teach and have made some studies on training methods for radio operators, bombardiers, aerial gunners and a few other specialties. Many Army training authorities are well acquainted with laws of learning as they



have been described in textbooks. Should a comprehensive program of Army psychology be developed it is obvious that training is one of the important areas to be emphasized.

A few possible improvements in the Army training program are widely known. Curricula of instruction, in spite of frequent attempts to find out what is needed, are often not sufficiently practical. One reason is found in the lack of a continuing and comprehensive job analysis program which would define the important tasks of each job. The selection of instructors could be improved by emphasis on interest and aptitude for instructing in addition to mastery of subject matter which has sometimes been the sole basis for selection. Training courses could at times have been improved if the emphasis for completion of the course had been placed on raised standards instead of on filling a quota despite quality of work performed.

Leadership, its selection and training, is a paramount problem of Army psychology which cuts across several other topics discussed herein. In general, the Army has given lip service to the importance of leadership, but that greater emphasis would yield significantly improved results seems a reasonable expectation. Non-commissioned as well as commissioned officers would be included in a thorough program of selecting and training the best qualified leaders. Proof of the possibility of a significant problem needing solution is widespread attitudes of disrespect for officers shown by enlisted men.

There is general agreement concerning qualifications of Army leaders. (1) Their personality should command respect and cooperation. (2) They should be genuinely interested in the welfare of their subordinates. (3) They should possess courage. (4) They should possess drive to complete assigned tasks and to initiate necessary actions. (5) They should possess certain minimum of intelligence and education. There are plenty of persons in the Army possessing the above qualifications but they are not officers in enough cases. One thing that has confused the issue is the matter of officer specialists who are not required to be leaders of men. Many people are in uniform as officers whose work could be done as well or better in civilian clothes, leaving the Army uniform to be respected more as the badge of a combat soldier. Perhaps psychologists are an example of professional and technical persons who should not wear the Army uniform. Perhaps a separate uniform for service personnel or for non-combatants, such as the Germans use, would be helpful. When officers fail as leaders they are usually reassigned to some administrative or specialist job. It seems to be assumed that a sufficient qualification as an administrative officer is failure in a combat job.

Selection as well as promotion of officers has been done too locally without sufficient regard for all eligibles. Take the case of a company which has an opportunity to recommend a candidate for Officer Candidate School. The company recommends their best man even when it is clear that he is not good enough. Thus the quota system works in favor of keeping down a rigorous merit system.

Training of leaders has received varying emphasis throughout the different Army branches. Infantry and Engineers have done an outstanding job of training in leadership traits. Limitation is mentioned above of the intelligence of the field from which Infantry officers are chosen. Services such as The Adjutant General's Department have failed almost no one in Officer Candidate School which is taken to mean that the selection was almost perfect. More likely it means that the standards for graduation were not sufficiently rigorous. Lack of officer characteristics in Air Corps pilots and in other flying officers is often



mentioned. There has been little attempt, presumably because of time limitations, to train Air Corps flying officers in traits of leadership.

Supervision of officers could be improved in such a way as to contribute to more effective leadership. Most important perhaps would be an accurate and forthright use of efficiency reports and performance ratings. These would serve their central purpose in evaluating officers for promotion and demotion. They would also be a valuable basis for supervising officers to improve their work methods. First it would be necessary for officers to learn the importance and the mechanics of efficiency reports and performance ratings. Time spent in making a study of each officer is not wasted but is an important part of the kind of supervision that is an officer's primary duty. Once the rating officer has had an opportunity to observe the officer sufficiently for a reliable rating the rating officer should discuss the strong and weak points with the one who is rated. Unfortunately all inaccuracies and leniencies are not due to a lack of skill but some are due to lack of honesty. Officers have been recommended for promotion with an excellent rating who were recommended for transfer as unsatisfactory by the same officer who rated them, and practically at the same time. Reasons given for leniency in rating are (1) living conditions in the Army where officers live together as a family and thereby become very friendly; (2) legalistic Army requirements of having to prove any unsatisfactory rating.

Another aspect of deficiency in American Army psychology of leadership is shown in the cartoons of Mauldin. Officers are pictured typically as preempting too many comforts, as being dead wood, as in general not being leaders whom enlisted men can respect.

Conditions and methods of work have been studied by a few psychologists. There has been no thorough and comprehensive program as to optimal conditions and most efficient methods of Army duties. No studies have been reported from the front line infantry, tanks, or planes. Nothing is known of psychological studies which could lead to greater efficiency in the Army's numerous machine shops and depots, nor of psychological studies which could streamline the Army's complicated administrative procedures. Two examples of possible improvements will be given. Directives are written in so many different media, are cross referenced in such a complicated way, and are distributed in such a spotty and often highly delayed manner as to mean that uniform compliance for a procedure is rarely obtained. Clear preparation and thorough distribution would save hundreds of man hours. A second example is somewhat related. Indorsements shuttle back and forth between various levels in some instances because of changes in regulations. This delays necessary action for weeks and sometimes even for months. There should be an understanding that an action begun under a regulation will be carried out even though the regulation is revised—unless the change is so important as to justify return of the papers. It would of course be necessary to specify in the revised directive conditions under which new actions would have to be initiated.

One improvement in Army administration is to have the optimum number of headquarters. This problem is largely one of business management but also touches on personnel administration and to a lesser extent on the psychology of work. There is a common belief in the Army that considerable lag in administration is caused by too many headquarters. Each additional headquarters, or layer, through which papers must be processed results in just so much additional delay unless the headquarters is actually essential for control. Morale in an unnecessary headquarters is often low because the members often do not have enough to do and realize that their duties are not essential.



Morale is a subject closely related to personnel classification, training, and to leadership discussed above. Army morale insofar as it is eagerness or at least willingness to fight depends on the soldier's believing that he is in the right job; on the soldier's believing that his training is adequate; on the soldier's believing that his leaders are competent. The program of informing the soldier as to the effectiveness of job placement, training, and leadership is a combined command and staff morale program. As is true of all propaganda it is weakened if those at whom it is aimed believe it to contain serious exaggerations.

Eagerness or even willingness to fight depends largely upon the soldier's believing that he is fighting for something worthwhile. Some of the large questions of psychological warfare, of political ideology and of economics run outside the field of psychology. Military honors and promotions which are stimuli to fighting are in part psychological matters. It is doubtful that they are handled in such a way as to produce the greatest respect for awards and for promotions.

In conclusion it is seen that much remains to be done in improving methods of psychology and in applying them in the American Army. Some organizational problems, such as the striving for a separate Air Force and the attendant profligate use of psychological talent, are too broad for psychologists to solve. The majority of problems presented require coordinated planning and action on the part of Army authorities and psychologists to bring about increased efficiency. Even in personnel classification and selection where the bulk of psychological talent has worked, improvement of methods and particularly a better use of them can be adjusted to personnel administration. In the important area of Army training, few psychologists have been employed directly. Psychological problems of leadership have received recognition in conversation but a thorough follow through has been lacking in large part. Conditions and methods of work have not been investigated in their psychological aspects. Morale has been studied by highly competent sociologists and social psychologists but front line supervisors have often not understood and not used their results.

It is recommended that the effectiveness of psychology in the American Army be improved by the following means to be worked out jointly between the Military Psychology Section of the American Association for Applied Psychology and the War Department.

(1) Introduce comprehensive courses in Military Psychology at West Point, at the Command and General Staff School, and at other important Army schools.

(2) Provide internships for graduate students of psychology to work on military research projects in military organizations. This would not only solve some problems but it would teach some psychologists Army organization, administration, and jargon.

(3) Create an advisory board of psychologists to spend considerable time advising the War Department on all phases of Army Psychology.



# THE ADJUSTMENT OF ARMY ILLITERATES\*

WILLIAM D. ALTUS, 1ST LT, AGD†

*Senior Personnel Consultant  
Ninth Service Command Special Training Center  
Camp McQuaide, California*

In brief, a special training center takes the newly-inducted illiterate and brings him to an approximate fourth-grade level of literacy within a maximum of twelve weeks' time. If he fails to meet the graduation level within the set time limits, he is discharged as inapt. If graduated, he enters upon his basic training at some other Army installation.

Previous publications by Altus (1, 2) were concerned with the validity of the Army version of the Wechsler Mental Examination for all illiterates and for certain racial and linguistic sub-groups among them. A publication by Altus and Bell (3) gave proof of the validity of certain types of oral adjustment tests in a special training center. The adjustment tests used in this latter study were not official tests. They were experimental, the hope being that they might show some validity for the specialized type of personnel work incidental to a training installation for Army illiterates.

Fortunately, the hope for validity of the adjustment tests was realized, at least to the extent of a biserial correlation of  $.453 \pm .028$  when the criterion was taken as the disposition of the trainee, i.e., whether discharged as inapt or shipped as a graduate. The N for this correlation was 507. Since these tests had demonstrable validity, it would have been desirable to continue them as part of the oral battery administered to every incoming trainee. By December, 1943, the press of work became such, however, that it was necessary to reduce the number of oral adjustment items.

A single test of 36 items was then devised. Twenty-four of the 87 questions in the original four tests of adjustment were retained, the basis of selection being the discrimination shown in successive item analyses. Six of these items were retained from each of the original four tests of adjustment, Army Adjustment, *Concentrated Bell*, *Hypochondria and Paranoia* (3). Six more items were obtained from an item analysis of the Depression scale of the *Minnesota Multiphasic Personality Inventory* (7), though these were shortened and changed, somewhat in wording. The final set of six came from a 25-point measure of hysteria developed locally by an Army psychiatrist, Capt. Sydney Kay, and the writer. The 36-point composite test of adjustment‡ has been in continuous

\* The opinions herein expressed are the author's; they do not necessarily reflect official viewpoints.

† Lts Jerry Clark and Ephraim Yohannan, T/4 Roy Burge, Cpl Henry Diffenderfer, T/4 Robert Ewart, Pfc Sidney Feinberg, T/Sgt Clarence Mahler, T/5 Grant Smith and S/Sgt James Taylor have all contributed to this article by administering tests, in the regular course of their duties, tabulating and statistically manipulating data. Credit is especially due T/4 Edmund Ellis for his statistical labors.

‡ The origin of the 36 items is as follows: Sixteen were locally constructed; fourteen, though shortened and usually changed in wording, came from the *Minnesota Multiphasic Personality Inventory*; six were derived, with some changes, from Bell's *Student Adjustment Inventory*. Drs. Hathaway and McKinley and Capt Hugh Bell have consented to the publication of the twenty adjustment questions, belonging to their tests, in the form in which they appear in Table I.



use since 15 December 1943 in the Ninth Service Command Special Training Center. In that time it has been administered to thousands of trainees.

Like the tests which preceded and, in part, fathered it, the 36-point test is not an officially sanctioned Army test. Both the new test and the old ones were experimental and pragmatic in nature, arising from the quite evident need for some quantitative measure of the adjustment of Army illiterates. It does not require much clinical work among soldiers of such marginal literacy and intellect to make clear the considerable role played by adjustment factors in the efficiency of an individual soldier in his application to an assigned task.

To discriminate among varying shades of adjustment in a special training center, a given instrument must be rather sensitive since all of the trainees have been individually examined by a psychiatrist prior to their induction, thus, presumably, weeding out all those with psychoses or with crippling psychoneurotic and psychopathic trends. The testable range of adjustment among trainees is thus foreshortened to the so-called normal group. Good clinical judgment would appear to be a better basis for estimating adjustment than a routine set of test questions, but after interviewing several thousand trainees, the author still prefers to put his faith in the quantifiable and the communicable.

It must be admitted, however, that psychiatrists in contrast to psychologists generally prefer the clinical impression to any set of stereotyped questions. The induction station psychiatrists, Curtis and Thorne (6) say, for instance, "A number . . . of personality inventories have been constructed and rather widely used but unfortunately the results have not provided a reliable index of neuroticism or psychotic tendency." In the same article they say, in reference to clinical insight, "After several years of experience in a standard examining situation, the examiner becomes able to sense the presence of normality or psychopathy during the first thirty seconds of the interview and is even occasionally able to make a shrewd diagnostic guess on first glance." Unfortunately such insight, unlike Elijah's mantle, is not transferable. Consequently, a personnel consultant who makes no claims to such insight and who must delegate much of his work to personnel untrained in psychiatry and with inadequate training in psychology must have recourse to other techniques, such as, for instance, the development by statistical methods of an instrument which will partially replace clinical ability of the nature cited.

### I. THE VALIDITY OF AN ADJUSTMENT TEST

Validity is determined by the criterion employed. In the present instance the criterion was the disposition of the trainee—that is, whether he would put forth his best efforts and graduate or whether he would show so little improvement, whatever the reason, that he would receive a discharge for inaptness. The extent to which adjustment, as operationally defined by the 36 questions, is associated with the dichotomous disposition of the trainee represents its validity as herein defined.

The range of effectiveness of the adjustment test was restricted for at least two reasons. One was the examination, previously mentioned, which operated to reject at the Induction Station those men who were obviously unfit for military service from the psychiatric standpoint. The population, therefore, consisted only of those who had been accepted as psychiatrically normal. The second factor which limited the effectiveness of the adjustment test was the varying degree of literacy among the "illiterate" trainees received. In a study of all trainees received for five weeks it was found that 31.2% of them could pass the two graduation tests the day of their arrival at the Training Center and therefore were already literate in the Army sense of the word. In this same



study there were 10.5% who, according to previous statistical studies, could not graduate within the restricted time limit imposed for their training. This latter group included (1) non-English trainees of low aptitude who were not completely literate in their native tongue, (2) English-speaking trainees of very low aptitude who were also almost completely illiterate on arrival and (3) trainees of marginal aptitude but who were so completely illiterate (could not read a word, knew few, if any, letters of the alphabet) that they could not hope to reach graduation level in the twelve weeks at their disposal. These two subgroups, the literate and the hopeless cases, comprised 41.7% of all the trainees

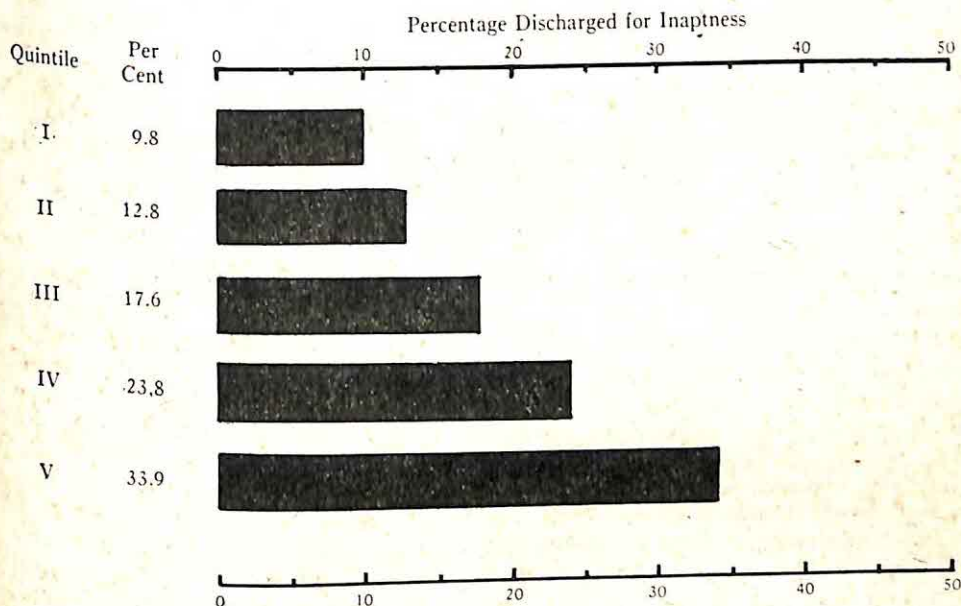


FIGURE 1. THE RELATION OF ADJUSTMENT SCORE, DIVIDED INTO QUINTILES, TO CHANCE OF OBTAINING AN INAPTNES DISCHARGE. N IS 3614. TRAINEES OF VARYING DEGREES OF LITERACY.

in the five weeks' study. Whatever validity the adjustment test possessed could operate effectively only with 58.3% of the total group; and all of the 58.3% had been accepted by the Induction Station psychiatrist with the implication that the individual trainee had sufficient emotional stability to withstand the rigors of military life.

It is with these two attenuating factors in mind that the data on 3614 cases are presented in Figure 1. These trainees have been divided into quintiles, according to adjustment scores, Quintile I being the best adjusted twenty percent of the 3614 trainees. It will be noted that only 9.8% of the best adjusted twenty percent of all trainees were discharged as inapt. Of the next one-fifth, Quintile II, 12.8% were so discharged. The percentage of inaptness discharges continues to increase in each of the succeeding quintiles until the maximum of 33.9% of all the trainees in the highest one-fifth of maladjusted score are so discharged. In percentage terms, there are more than three times as many inaptness discharges among the most poorly adjusted one-fifth as there are among the best adjusted one-fifth. Within quintiles the factor of adjustment also operates. In Quintile V, the most poorly adjusted one-fifth, the percent receiving inapt-



ness discharges varies from 25 among the relatively better adjusted of this maladjusted group to 50 for those in the highest one percent of maladjustment. It is probably needless to remind the reader that *adjustment* in the foregoing sentences does not refer, necessarily, to the true state of a trainee's mental health but to his score on the orally administered set of 36 questions.

It would appear then that the test of adjustment has some validity despite the varying literacy of the "illiterate" trainee and despite the screening by the psychiatrist at the Induction Station. At least two objections which might be raised to the putative validity of the adjustment test come to mind: (1) The test is saturated with literacy factors; (2) malingering is common to both literacy and adjustment tests. The first objection may easily be met. The Pearson-product  $r$  of the adjustment test with the group test (literacy) for placement in classes at the Center is only  $.141 \pm .011$ ,  $N$  of 3634, what little relation there is being read as "The more literate are slightly better adjusted." It may also be noted that in five different factor analyses of language and racial groups at the Center literacy and adjustment invariably appeared as separate factors without common significant loadings. It thus seems clear that the ability to read bears little relationship to adjustment among Army illiterates. The fact that the relationship between the two measures is so small would seem to argue against much malingering on the part of the trainees as well. It has been the author's experience that malingering is not very common among trainees. When it does occur, it is fairly easy to detect. Each soldier is subjected to eight or nine tests, six of which are of the interview type, before he begins his instruction. Therefore, it is difficult, though not impossible, for him to present a set of malingered scores which are sufficiently uniform when profiled to appear within the normal range of deviation. It may parenthetically be added that the experience of this section has been that it is much easier to catch a malingerer than it is to cure him.

In order to partial out or hold constant the factor of literacy, another study was made. For a period of months, all those who scored zero on the Mental Qualification Test (a 17-point test of literacy employed at the Induction Station) were tabulated according to adjustment score and according to type of disposition. The 1061 trainees in this study, though completely illiterate so far as the Mental Qualification Test is concerned, were bright enough to pass either the group or the individual performance tests used for screening illiterates at the Induction Station. It should be mentioned that many of these men were somewhat literate, even though they did score zero on the literacy test. Unfamiliarity with group tests, fright and other emotional factors probably were responsible for the failure of certain of the 1061 to score on the Induction Station test. Included within this total group were, however, many hopeless illiterates—hopeless, that is, from the standpoint of being graduated from this Center. By no means, however, are all of the completely illiterate trainees barred from graduation. But it is difficult for one whose verbal aptitude is below the Center's average to become literate in the Army sense of the term unless he had some slight literacy to build upon and unless he is willing to work hard to learn.

Only 41.2% of the 1061 trainees scoring zero on the Mental Qualification Test were eventually graduated from the Center, roughly two out of every five. Figure 2 tells the story for this group. Of the best one-fifth, in terms of adjustment score, 61.7% were graduated. In the most poorly adjusted twenty percent, Quintile V, only 21.1% became graduates. There were three times as many graduates, percentagewise, in Quintile I as there were in Quintile V.



Conversely, there were over two times as many inaptness discharges (78.9%) among the most poorly adjusted as there was (38.3%) among the best adjusted. The adjustment test is clearly more effective among this relatively illiterate group than it is for the whole group of trainees with their varying shades of literacy. When the chances of graduation or discharge are relatively even, as they are in this second study, a man's set of attitudes subsumed under the title of mental health or adjustment is quite important to his disposition. Of the best adjusted (Quintile I) three out of each five men were saved; of the most maladjusted (Quintile V) only one in five is saved for military duty. Of those

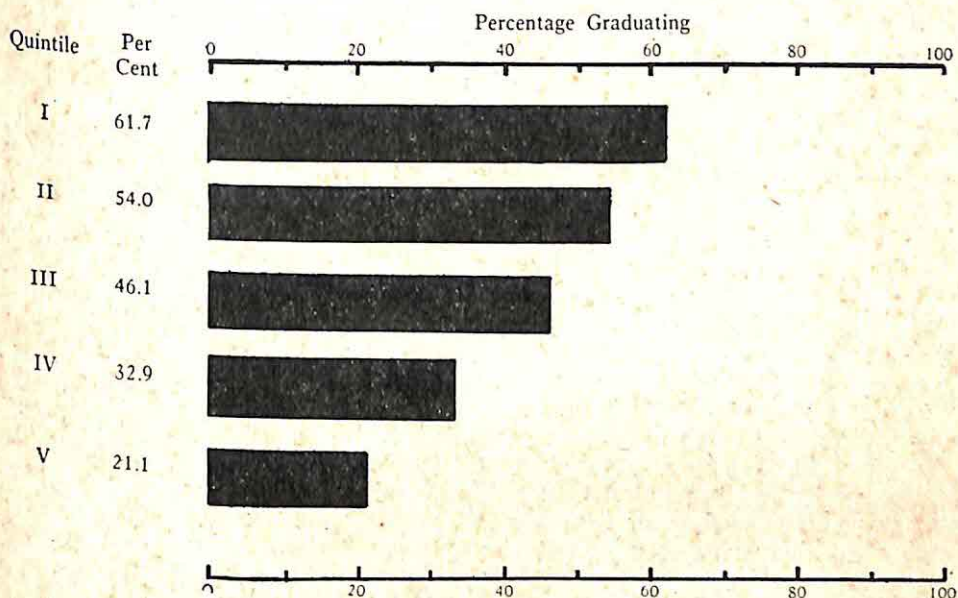


FIGURE 2. THE RELATION OF ADJUSTMENT SCORE, DIVIDED INTO QUINTILES, TO GRADUATION. N IS 1061. ALL SCORED ZERO ON THE INDUCTION STATION TEST OF LITERACY, THE MENTAL QUALIFICATION TEST.

trainees in the highest one percent of maladjustment (included, of course, in Quintile V) less than one in seven is graduated. It is belaboring the obvious to say that adjustment is one of the factors to consider when attempting to predict the type of disposition a trainee will have meted out to him.

The question of the differential validity of the adjustment test for the varying groups within the Center is next considered. Figure 3 shows in graphic fashion that validity is as much a function of the group tested as it is of literacy. The highest validity coefficient, .64, is for the non-English, Spanish-speaking group. It should be noted here that Figures 1 and 2 contain data on the English-speaking trainee only. How, it may be asked, could a non-English group be tested on an English test? In order to obtain a measure of the adjustment of the non-English, Spanish-speaking trainees, the writer translated into Spanish the first eighteen of the 36 adjustment items, which appear in their English form in Table I.

The trainee who is non-English on arrival at the Center must be relatively superior in intellect, language aptitude, adjustment and literacy in his native tongue if he is to pass the graduation tests within twelve weeks and also learn



group; rather interestingly, four of the five had a lower than average score on the general aptitude test, the Army Wechsler. The adjustment test was most valid for those in the intermediate range of literacy, that is, between the extremes just discussed. Six out of every seven of those discharged for inaptness in this intermediate range were maladjusted, while five out of every eight of the graduates were among the well-adjusted group. For this latter group the validity of the adjustment test is .71.

For the bi-lingual Mexican, adjustment does not have quite the same significance as for the Indian, the Negro and the non-English, Spanish-speaking trainees. The bi-lingual Mexican more nearly lived up to his initial literacy, as measured by the oral reading and group placement tests, than did the Indian or the Negro. Of the 300 bi-lingual Mexicans, 206 scored nine or more points on Gray's Oral Reading Test and also scored 30 or more points on the group placement test. One hundred ninety-eight of these 206 were graduated. At the lower end of the scale, 48 scored from zero to four on the group placement test and also scored zero on the oral reading test. All but one of these 48 trainees were discharged as inapt. The one who passed the graduation tests was a well-adjusted trainee. The adjustment test was of significance only for the 46 trainees whose literacy lay somewhere between that of the two groups just discussed. Twenty-nine of these 46 trainees were graduated; 23 of the 29 were well adjusted. The correlation of adjustment and disposition for this restricted group is .54. The adjustment test has comparatively little validity for the bi-lingual Mexican since the test operates as a discriminating measure for less than one-fifth of the total group.

Adjustment was of least importance to the disposition of the 300 native-born, old-line, American trainees, called White in Figure 3. As with the bi-lingual Mexican, their entering literacy was practically the only factor of significant predictive value. Of the 201 scoring nine or more on the oral reading test and 30 or higher on the group placement test, 194 were graduated. Five of the seven discharged for inaptness in this more literate group were maladjusted; only two were well adjusted. Thirty-six of the 300 Whites scored zero on the oral reading test and from zero to four points on the group placement test. Only two of this latter group, which was initially so illiterate, were graduated. The validity coefficient of the adjustment test for the remaining 63 who were intermediate in initially tested literacy is only .27, just slightly higher than for the total group of 300, where the  $r$  is .20. So far as predicting disposition is concerned, the adjustment test adds little of actuarial value to the measures of literacy for the White group.

It is evident from the foregoing paragraphs that adjustment is quite significant in the disposition of the Negro and the Indian and highly significant for the non-English, Spanish-speaking trainees. For the bi-lingual Mexican and for the Whites, a score on the adjustment test has relatively little value as an indicator of disposition. No satisfactory explanation of the diverse validities of the adjustment test for the English-speaking trainees is forthcoming. None of the explanations which come to mind adequately rationalize the profound differences among the four groups in the order of their  $r$ 's when disposition is the criterion and adjustment is the predictive variable.

Only the validity of the adjustment test in its association with graduation and one type of discharge—that for inaptness—has so far been considered. If the 36 items are actually measuring variations in adjustment they should show some validity for trainees who have received discharges for psychoneurosis and



for nocturnal enuresis in which no pathology of the genito-urinary system was involved. In 1944, 36 trainees were diagnosed by the psychiatrist as psychoneurotic and discharged by the Medical Corps for that reason alone or because it was one of the contributing factors in the disability. Through February, 1945, 29 trainees were discharged for nocturnal enuresis in which pathology was not the causal factor. Only one of the 36 psychoneurotic trainees was among the best one-fourth of the trainees in adjustment score, while all but five had scores above the average in maladjusted score. Twenty-one of the neurotics had scores which placed them among the highest one-fourth in maladjustment; thirteen were in the highest ten percent of maladjustment and five were in the highest one percent of maladjustment. In terms of the standard deviation of the adjustment scores of graduate trainees, the psychoneurotics have a mean maladjustment score which is 1.21 sigmas higher than the mean score for the graduates. The 36 psychoneurotics earned a mean standard score on the Wechsler Mental Ability Scale, Form B, which was higher than that of the average incoming trainee and almost as high as that of the average trainee who is graduated. The fact that this disturbed group of trainees was psychometrically brighter than the average trainee is quite interesting since the Pearson product-moment correlation of adjustment score with the Wechsler is  $.180 \pm .010$  (N of 4261), the  $r$  being read as "The better adjusted are somewhat brighter." Adjustment, *per se*, uncomplicated with intellectual factors as such, appears to be the causal agent in most of the discharges for psychoneurosis.

Nocturnal enuresis without pathology among adults is so generally considered an indicator of poor mental health that the Army discharges such cases whenever they are found. The average maladjusted score of the 29 enuretics was only 1.3 points below that of the psychoneurotics and was slightly more than one full sigma higher than the mean score of trainees who were graduated, in terms of the standard deviation of the latter group's adjustment scores. Only five of the 29 enuretics were among the better adjusted one-half of the trainee population. Nineteen of the group were in the highest one-fourth of maladjusted score; 11 of the 29 were in the top ten percent of maladjusted score; and four were in the highest five percent of maladjustment. Unlike the psychoneurotic group, the enuretics were slightly below the Center average in Wechsler standard score; they were, however, comfortably above the average score earned by those trainees who are discharged for inaptness.

Data on the reliability of the 36-point test have not as yet been presented because, though reliability is necessary in a test, it is of minimal importance in comparison with validity. Reliability, as inferred from a single administration of the test, has twice been checked by correlating the odd-even items and then applying the Spearman-Brown prophecy formula. For 100 cases the reliability was .932; for 300 cases in a later study the  $r$  was .923. The test-retest reliability was determined by re-testing 129 trainees after an average lapse of 64.32 days. The standard deviation of this latter mean was 32.41 days; the range was from seven to 122 days. The coefficient for this group was .848. The test-retest reliability is noticeably lower than the single administration type of reliability. Subtle shifts in the trainee's mood and his "feeling tone" may account for some of the difference in the two kinds of reliability coefficients. It is of interest, however, that the mean difference in maladjustment score from one testing to the next was only one-tenth of a point. The reliability of the adjustment test appears to be adequate when the comparatively small number of items contained in it is considered.



TABLE I

DATA RELATING TO VALIDITY AND RELIABILITY OF THE INDIVIDUAL  
ITEMS OF THE ADJUSTMENT TEST

R*	DV†	VH**	Item No.	Item
.53	.23	.32	1.	Does it bother you to sleep and eat and wash with so many men?
.73	.25	.27	2.	Did your draft board give you a raw deal?
.68	.44	.16	3.	Could you do more for your country on your civilian job than you can here?
.93	.50	.42	4.	Did they give you a good physical examination at the Induction Station?
.91	.57	.64	5.	Are you strong and healthy enough to be a soldier?
.80	.46	.46	6.	Does it bother you to stand and wait in a group?
.40	-.02	-.04	7.	Do you feel blue very often?
.64	.40	.16	8.	Do you feel very tired toward the end of the day?
.60	.23	.18	9.	Does it bother you to talk to a person that you've just met?
.48	.33	.34	10.	Do you often feel just miserable?
.83	.18	-.07	11.	Are your feelings easily hurt?
.58	.23	.11	12.	Do you have trouble sleeping at night because you lie awake thinking about things?
.89	.43	.54	13.	Are you well most of the time?
.76	.31	.37	14.	Do you feel dizzy quite often?
.80	.43	.59	15.	Does your hip or back bother you very much?
.75	.37	.46	16.	Do you get short of breath easily?
.84	.46	.53	17.	Do you have many headaches?
.78	.30	.23	18.	Do your feet hurt you when you walk a lot?
.86	.17	.16	19.	Have you had lots of hard luck?
.80	.33	.10	20.	Do you feel lonely most of the time?
.62	.03	.13	21.	Do you often feel that the whole world is against you?
.61	.16	-.04	22.	Have people played mean tricks on you when they had no reason to?
.75	.00	.17	23.	Is anyone talking about you behind your back?
.82	-.10	.00	24.	Is anyone working against you behind your back?
.56	.27	.10	25.	Do you often wish you could be as happy as other people seem to be?
.66	.43	.24	26.	Do you worry about a lot of things?
.78	.23	.42	27.	Do you have trouble keeping your mind on what you are doing?
.67	.38	.34	28.	Do you feel useless and no-account quite often?
.78	.19	.21	29.	Do you often have trouble getting started doing things?
.82	.20	.11	30.	Do you sometimes feel so low that you don't care what happens to you?
.89	.25	.18	31.	Do you feel vomity (or as though you'd throw up) very often?
.90	.30	.37	32.	Do you often feel fainty, as though your legs would give way?
.76	.32	.28	33.	Do you often feel nervous and trembly and shaky inside?
.68	.50	.44	34.	Do you often have headaches that feel as though you had a tight band around your head pressing in?
.65	.44	.45	35.	Do you usually feel tired and doxy in the morning as though you hadn't slept at all?
.73	.28	.23	36.	Tunnel vision (Question too long to give here.)

\* Based on 100 cases, test-retest.



## II. DATA ON THE INDIVIDUAL ITEMS

Three correlations precede each individual item in Table I, in which all of the adjustment questions are given. The tetrachoric  $r$ 's in this table, like the ones given in Figure 3, were estimated from the computing diagrams (5) devised by Chesire, *et al.* The test-retest reliability of each item is given in Table I and also two validity coefficients, one of which is the dispositional validity (graduation *vs* inaptness discharge), while the other is the validity for hypochondria. Hypochondria is here defined in this manner: An individual was considered hypochondriacal if he repeatedly reported himself sick in the morning, was returned to duty by the medical officers five or more times—nothing being found organically wrong with him—and if he was never hospitalized by the physician in charge of sick call or returned to his quarters to recover from his putative ailments. Conversely, if a man never went on sick call a single time, he was presumed to be free from hypochondriacal taint.

The dispositional coefficients appearing in the second column of Table I are somewhat higher than they should be because an equal number of graduates and trainees discharged for inaptness is included. This heavy weighting of the inapt in the tetrachoric quadrants causes a distortion of about .05 in a  $r$  of .50 as checked empirically. For coefficients of lower value, the distortion is proportionately less. The  $r$ 's for hypochondria in the third column are also too high but for a different reason. The magnitude of these  $r$ 's is somewhat inflated because they represent extremes in distribution, the middle group being excluded. Since the exact association of each item with hypochondria, as here defined, was not so much desired as were the relative validities of the separate items, the omission of the middle ranges is of little importance.

An inspection of the table will reveal that the validities of items 4, 5, 6, 13, 15, 17, 34 and 35 are rather high for both criteria. A trainee who feels that his health is bad appears not only to frequent sick call more often but also to obtain inaptness discharges with greater than chance incidence. Items 5, 6, and 13 are general, overall questions relating to health; the other quite valid questions are, with the possible exception of item 6, ones relating to more definite and specific symptomatology. Items 3, 8 and 20 have good dispositional validity but are relatively poor for hypochondria, while the converse is true for item 27. Generally, the two types of validity tend to vary together. The rank-difference correlation between the two validity coefficients for all 36 questions is .62. When the validities for those items referring to health are correlated, the rank-difference coefficient becomes .79. The health items are items four and five in Army Adjustment and all of the hysteria and hypochondria sets, fourteen items in all. One may infer that many of the trainees who persisted in going on sick call day after day did not apply themselves too vigorously in the Center's school, thus eventually failing to meet graduation standards within the allotted time.

It is possible to obtain a linear relationship between a trainee's adjustment

† Dispositional validity, based on 100 graduates and 100 trainees discharged for inaptness.

\*\* Validity for hypochondria, based on 100 Negro trainees, 50 of whom had been returned to duty by the Medical Officers five or more times and none of whom was hospitalized or marked "Quarters." The other 50 had never reported on sick call a single time. Total population was 515, 151 of whom had never been on sick call; 72 had been five or more times marked duty and never hospitalized; 282 had been on sick call one or more times but did not fit into the restricted sick call group.



But it is clear that in a few minutes' time an objective, permanent record of certain phases of a trainee's attitudes of patent importance to his Army career was obtained. In such a form the test did not place a premium on clinical insight and could be administered by interviewers, some of whom came to the section with no training in individual psychometric techniques.

### III. SUMMARY AND DISCUSSION

It has been shown in this paper that a short, orally administered adjustment test had validity in an Army Special Training Center. Its validity was demonstrated in two ways. First, it was shown to be associated with a trainee's type of disposition, that is, whether he was graduated and retained in the Army or failed to graduate and was returned to civilian life with a discharge for inaptness. Second, the test was shown to be associated with the number of times the Army physicians could find nothing organically wrong with a trainee who reported himself as ill. In general, an item valid for the first criterion was also valid for the second. The test-retest reliability of the individual items was found to have a relatively low association with either type of validity.

The dispositional validity of the test as a whole was shown to be partially determined by two factors, the literacy of the "illiterate" trainee and the racial or linguistic grouping to which he belonged. The effect of literacy is easily understood. If a trainee is so illiterate that he knows at best only a few letters of the alphabet, it is very difficult for him to attain an approximate fourth-grade level of literacy in twelve weeks; consequently, so few in this category were graduated that adjustment, either good or bad, could play little part. On the other hand, a considerable number of the incoming "illiterates" could either pass both of the graduation tests on arrival or so closely approximated the literacy requirements for graduation that adjustment could have no effect on their disposition, since all of them were eventually shipped as graduates of the Center. For those trainees of intermediate literacy, that is, who lay between these two extremes, adjustment was of prime importance, being perhaps the most important single variable in their disposition.

The second important factor in the dispositional validity of the adjustment test was the matter of race and linguistic grouping. Generally, the adjustment of the non-English, Spanish-speaking trainee and the trainee of either American Indian or Negro descent was strongly associated with his type of disposition. For the non-English, Spanish-speaking trainee, who, of course, had no literacy in English on his arrival, adjustment was of more importance than aptitude, insofar as the latter was determined by the two tests with the highest association value with the criterion of disposition. For the Indian and for the Negro of intermediate literacy, adjustment was of marked significance in the type of disposition he obtained. For the bi-lingual Mexican and for the old-line, native-born, American White, adjustment did not have the same value as for the other groups, even in the so-called intermediate range of literacy. An attempt to rationalize these group differences in adjustment test validity brought forth some conjectures which seemed immediately plausible but which lost their plausibility upon more rigorous analysis. Consequently, no attempt will be made to explain the anomaly of the differential group validity coefficients. But it must be admitted that racial and linguistic groupings of trainees are determining factors in the dispositional validity of the adjustment test, even though the etiology of those differences cannot be satisfactorily explained. One unsolved problem which derives from this study is the problem just



considered. Another even more important one is this: While many more of the very maladjusted tended to be discharged for inaptness, regardless of literacy or of measured aptitude, than was the case with the well adjusted, it is true that many of the maladjusted did graduate. What difference exists, one may ask, between the highly maladjusted trainee who graduates and the maladjusted soldier who receives an inaptness discharge? The converse statement could be made for the well adjusted in the same manner. One possible, but untested, hypothesis occurs to the writer, so far as the maladjusted in score are concerned. The first and most heavily loaded of all the factors found in the adjustment test is depression. Though all the depression set had high and quite significant loadings in this factor, other items in the test also were included. Consequently, it may be inferred that some of the trainees who earned high maladjusted scores were suffering from what one Army psychiatrist called "reactive depression" owing to induction into the Army. If some of these "reactive depressives" overcame the mood induced by the induction shock during their stay at the Center, it may be assumed that after their recovery they applied themselves to their school tasks with more zeal; on the other hand, no such change would be reflected in the behavior of the truly maladjusted, to whom induction into the Army was only an incident. One other possible explanation of the problem is the assumption that although all of those high in maladjusted score were equally maladjusted, some of them through differential training in their earlier years learned to inhibit overt expression of their latent maladjustment through the same type of mechanism which is used by some paranoiacs who conceal their paranoia until a traumatic episode occurs which brings it to light. If the latter explanation appears to have some validity, it behooves those working in the area of adjustment to attempt the measurement of this inhibitory process, for with such a measure more effective predictions could be made from an adjustment test.

The question of the validity of the adjustment test for other groups besides trainees in an Army Special Training Center may occur to the reader. It is the opinion of the writer that the items, other than those six derived from Bell's *Adjustment Inventory* (4), would show little validity for other groups, simply because they are too "strong." There is considerably more hysteria, hypochondria, paranoia and depression among these men of low socio-economic status and of marginal intellect than is true of groups approximating normal intelligence and socio-economic level. For these latter groups, more subtle questions would doubtless be required. One may hope, however, that it shall be possible to devise a short testing instrument for oral administration which will be just as valuable to the clinical psychologist as the 36 items considered in this article have proved to be for Army illiterates. Such an adjustment test should ideally consist of short, highly valid sets of questions, which would give readings of diagnostic value for many well-defined syndromes of maladjustment.

It is also possible that future research may show that a properly validated adjustment test, either oral or written, can be of aid in scholastic prediction in high schools and colleges, particularly for those students of marginal aptitude and preparation, corresponding in the present study to "illiterates" of intermediate literacy. This statement is made because it is logical to assume that the near failures in our public schools are occasionally the victims of poor motivation resulting from poor adjustment. It also seems probable that an oral adjustment test in the hands of a trained clinician would be of marked value in personnel work in industry. An industrial interviewer, gifted in obtaining rapport with applicants for jobs, would more likely obtain true answers and



significant inferences by the person-to-person method of interview than he would with a paper and pencil test of adjustment. It is a hypothesis, in any event, which appears worthy of testing, though the research required would no doubt be considerable. And there could be no assurance, as there is none in the present study, that the results, even though positive, would not be so parochial in their derivation that no general application would be admissible.

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## PSYCHOLOGY AND WAR: NOTES

*Establishment of Research Board for National Security.* Establishment of the Research Board for National Security by the National Academy of Sciences has recently been announced in a joint statement by the Honorable Henry L. Stimson, Secretary of War, the Honorable James Forrestal, Secretary of the Navy, and Dr. Frank B. Jewett, President of the National Academy of Sciences.

The objective of the Board will be to continue, pending final consideration by Congress on creation of an independent agency, the close cooperation between civilian scientists and the Armed Services which has proven to be such a vital element in the prosecution of the war.

Composed of high ranking officers responsible for the needs and plans of the Army and Navy, together with an equal number of distinguished representatives of science, engineering, medicine, and industry, this Board includes many of the features of the Office of Scientific Research and Development, which has proven so successful as a wartime agency in mobilizing civilian scientists and coordinating their work with the requirements and operations of the Armed Services.

The charter of the new Board provides for up to twenty civilians selected with the advice of the Chairman of the National Research Council and the Council of the National Academy of Sciences; also up to ten high ranking officers each from the Army and the Navy, nominated by the respective Secretaries, all to be appointed by the President of the Academy. Five members of this Board constitute its Executive or operating Committee, three of the five are civilians, of whom one is chairman of the Board and the Executive Committee. The two Army and Navy members are officers charged in their respective departments with coordination of research. The members of the Board serve as such without compensation. The research activities are to be carried out under contracts whereby existing laboratories and facilities will be used wherever practicable.

The duties of the Board are specified in its charter as follows:

It shall be the duty of the Board to formulate programs of scientific research and development relative to problems of national security, to direct and conduct the scientific study of such problems and to advise the Secretary of War and the Secretary of Navy on the applications of science to national security. Science is here broadly interpreted to include the employment of scientific method of analysis, experiments and tests in any branch of science or technology, including engineering, medicine, psychology, and biology. Special consideration shall be given to possibilities arising from progress in science and technology. The Board shall, in no way, relieve the Army or Navy or other governmental agencies of their responsibility for, or authority over, research and development work conducted under their legal cognizance.

The initial membership of the Research Board for National Security follows:

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REAR ADMIRAL DEWITT C. RAMSEY, Chief, Bureau of Aeronautics



*Testing Civilian Employees in Army Service Forces.* MAJOR WALTER C. VARNUM, formerly of the department of psychology, Los Angeles City College, has been appointed Chief, Civilian Testing Section, Headquarters, Army Service Forces. The mission of this section is the establishment and supervision of industrial testing programs affecting more than 750,000 civilians employed by Army Service Forces. WILLIAM C. KVARACEUS and HERBERT WEAVER are assisting Major Varnum in the capacity of Personnel Technicians. WALTER N. DUROST served as Technical Consultant in the organizational stages of the program. About thirty psychologists have already been placed as Test Technicians in charge of the programs at various installations and five have been placed as Directors of Testing at headquarters offices of the staff divisions, technical services and service commands which make up Army Service Forces. An active recruitment program is under way to obtain qualified technicians to meet the demands of the expanding program.



## BOOK REVIEWS

*Psychology for the returning serviceman.* COMMITTEE OF THE NATIONAL RESEARCH COUNCIL. Washington, D. C. and New York: Infantry Journal, Penguin Books, 1945. Pp. 245.

The success of *Psychology for the Fighting Man* was so great and its reception so favorable that the Emergency Committee in Psychology of the National Research Council moved forward with the sponsorship of a similar popular book for the returning serviceman. Similar procedures which involved securing short sections prepared by technically qualified psychologists and rewriting them into a coherent whole, were followed in preparing the text. Irving L. Child of Yale University and Marjorie Van de Water of Science Service acted as editors with substantial assistance from Edwin G. Boring and Col. Joseph I. Green, both of whom played important roles in the development of *Psychology for the Fighting Man*. That the result is a cooperative effort of magnitude is indicated by the long list of collaborators and critics who either prepared or checked material for the book. The outcome is a volume that is very readable and yet based upon the technical skill and opinions of many experts.

The first half of the book covers topics of interest to all servicemen as indicated by the chapter headings: *Out of uniform, Meeting problems and looking ahead, Choosing a job, Learning new skills, Getting married, Returning to your wife, Being a father, The veteran as a citizen, and Social conflict*. The second half is concerned with the adjustment of special groups of servicemen who have suffered the rigors of war in an unusual degree or have returned with shock or injury. Its chapter headings are *POW, Getting well, Building up, NP, Combat nerves, Injuries to the nervous system, Injury to sight or hearing, and Loss of limb*. The final chapter *Years of your life* is addressed to all.

In length, the book is shorter than the *Psychology for the Fighting Man*. At times one wishes that particular parts were more detailed. Less is known about many of the areas covered in this book than was the case with its predecessor. One misses the realistic atmosphere, which from the outset is given in *Psychology for the Fighting Man*, by the very substantial and quite specific material of obvious practical utility that grows out of the psychology of sensation, perception and learning. Somewhat greater difficulty may have been had in organizing the material for this book and in securing agreement on its contents. And often one feels that some of the statements made are in the nature of platitudes or generalizations based upon good common sense rather than the specific findings of research. This is not a criticism of either the authors or the editors, but of the status of our field. A book such as this lies in the area of personality adjustment, an area in which the science of psychology is less further advanced than in those areas for which there is a tangible relation to preparation for and participation in combat.

But whatever the limitations of our present knowledge, this book does come to grips with many of the practical problems of the returning veteran. In addition to many specific helps, it should give him some insight into his own problems of adjustment, some comfort in finding his problems are not unique but are shared by many millions of other persons, and some feeling for the psycho-



logical rather than the naive approach to human and social problems. One can express a wish for as wide a circulation as its predecessor. Both are significant experiments in making scientific content and modes of thinking available in popular form to a wide public.

JOHN E. ANDERSON.

*University of Minnesota.*

LINTON, R. *The cultural background of personality*. New York: D. Appleton-Century, 1945. Pp. xix + 153.

This brief book represents the published form of five lectures on the general subject of the interrelations of Culture, Society, and the Individual, given under the auspices of the Cooper Foundation at Swarthmore College in 1943. It is dedicated "To the students whose questions may induce their professors to read this book." Perhaps the chief criticism which may be made of it is that their professors will find it inadequate and unsatisfactory, while they themselves will turn from it before finding the answers to their questions because of the very dullness of its style.

The first three chapters are concerned with defining the individual, culture, and society, with an attempt to draw together the attitudes of those primarily interested in sociology, anthropology, and what Linton refers to as "personality psychology." The last two chapters *Personality* and *The Role of Culture in Personality Formation* are the ones which will be of interest to the psychologist.

The average psychologist, however, will be dissatisfied with both of these. Most of them will be totally at variance with one of the basic statements, "We may take as our first premise that the function of the personality as a whole is to enable the individual to produce forms of behavior which will be advantageous to him under the conditions imposed by his environment" (86). Personality is an end product which characterizes the individual, rather than a constituent element serving a functional rôle in this sense. Nor will most psychologists be any happier at the division of responses into those which are *emergent* (evoked by new and unfamiliar situations), and those which are *established* (habitual). To Linton there are two important responses, those which are specific and developed through repetition, and those which are generalized and hence evolve into *value-attitude systems*. Even though he takes into full account the degree to which every response includes both overt and covert elements, he has not sufficiently accounted for those responses which arise out of complexes, repressions, and the deeper, more significant, levels of the unconscious.

The final chapter on *The Role of Culture in Personality Formation* is of course the crux of the volume, but it is even less satisfactory than the preceding one. He dismisses, rightly, the theory that innate, biologically determined factors could account for personality configuration. Next he goes on to demonstrate the manner in which culture can do this. Probably the widest disagreement will be with the statement that "common personality elements together form a fairly well-integrated configuration which may be called the *Basic Personality Type* for the society as a whole" (129, *italics* his). Even though this concept is slightly modified by the addition of a variation, "status-linked response configurations may be termed *Status Personalities*" (130). Even the most ardent adherent of a type theory of personality would scarcely agree to so drastic a delimiting of type. And even were one to admit it, the theory that it results primarily from the parent-child relationship as culturally determined seems



hardly adequate. What Dr. Linton seems to lose sight of, even in his theory of a culture construct pattern (which corresponds to the mode of the variations within a real culture pattern), is that the culture pattern of any society must of necessity contain attitude-value systems which are at variance with and in conflict with one another. Many of the differences as well as similarities in personality arise from the individual mode of reaction to these conflicting differences in accordance with the motivations, the needs, and the temperaments, as well as the childhood experiences of the individuals concerned.

While the book is of value for its attempt to draw these three disciplines of anthropology, sociology and psychology together in the effort to understand personality; and while most readers will appreciate the attempt to achieve a consistent terminology for the three disciplines; it will nevertheless remain unsatisfactory for the vast majority of psychological readers.

DOROTHY T. SPOERL.

Jeffersonville, Vermont.

NOBLE, RUTH CROSBY. *The Nature of the Beast*. Garden City, N. Y.: Doubleday Doran, 1945. Pp. 224.

Ruth Crosby Noble has written "a popular account of animal behavior from the point of view of a naturalist." The book is based largely on the research results, literature reviews, lectures and informal notes of the author's late husband, Dr. G. Kingsley Noble.

Dr. Noble was a curator of the American Museum of Natural History, New York City. He effectively combined, in his studies of animal activities, the research procedures of the field naturalist and of the laboratory investigator. Dr. Noble realized that many problems of the sensory, motor and motivational capacities of animals which are discovered by field observations must be finally investigated by controlled experiments. He acted on this conviction and organized and put into operation a model behavior research laboratory in the American Museum. The work of this rather unique laboratory reflected Dr. Noble's wide research interests; the book under review has revealed even more extended interests. These ranged from sensory capacities of the wood tick to the social organization of primate groups.

Those who are interested in comparative psychology can judge the range of subject matter in *The Nature of the Beast* by the chapter headings: animals, domain, world of sensation, creatures of instinct, animals can learn, intelligence tests, higher intelligence, emotions, societies, social rank, staking out territory, sex recognition, courtship, parenthood, animals at play, hormones and behavior, abnormal behavior, and behavior and evolution. These subject headings suggest, furthermore, the pertinence of the book to the field of academic comparative psychology. There is a selected bibliography of ninety-five titles of which thirty-two are references to publications of Dr. Noble. There is also an eight page index.

*Evaluation.* The information in the book is factually correct. Ruth Crosby Noble did not compromise accuracy of research results and literature reviews in order to present these in a popular and interesting style. The manuscript was read by Doctors Robert M. Yerkes, Carl J. Warden, Frank Beach, T. C. Schneirla; and parts were read by Doctors Ernst Mayr and Ludwig Hirning. Therefore, both comparative psychologists and naturalists have had the opportunities to verify the author's transcriptions and reproductions of Dr. Noble's collected information.



The subjects dealt with in *The Nature of the Beast* are presented with a commendable breadth of perspective, and yet the importance of details is duly emphasized. Students of animal or even of human behavior who read the book will discover interesting and stimulating facts not generally considered in psychology courses. This is true because in this volume the refreshing viewpoints of field naturalists are organized with the results of controlled laboratory experimentation. Also, psychologists will learn something of species of animals which are rarely used as subjects in comparative psychological laboratories.

The subject book is said to be popular. The sub-title reads: "A popular account of animal psychology from the point of view of a naturalist." This should not repel the serious student of animal behavior, for although the style is free and interesting every chapter is filled with facts.

The reviewer suggests that *The Nature of the Beast* should be used as collateral reading in every course on comparative psychology.

C. R. CARPENTER.

*The Pennsylvania State College.*



## NOTES AND NEWS

JOHN WALLACE NYGARD, 2nd Lieut., A.U.S., died at the age of thirty-seven years at Walter Reed Hospital after an illness of several months contracted during service in France. Lieut. Nygard was on leave from the University of Tulsa, Tulsa, Okla., and had served as psychologist with the 199th General Hospital in France. Before going to the University of Tulsa, he had served as psychologist at the National Training School in Washington, and had been psychologist in the Public Health Department of North Carolina. He received his B.A. from a Wisconsin State Teachers College in 1928, his M.A. from Iowa in 1929, and his Ph.D. from Michigan in 1937. He entered the Army in May, 1942.

STUART HENRY ROWE, who was head of the department of psychology and pedagogy (1904-10), Brooklyn Training School for Teachers, died, June 5, at the age of seventy-six years.

BROTHER CYRIL LEO, an instructor in Manhattan College (New York City), who taught courses in psychology, philosophy, and the classics, died, May 30, at the age of thirty-five years.

GEORGE D. STODDARD, state commissioner of education and president, University of the State of New York, has been named as the tenth president of the University of Illinois to succeed ARTHUR CUTTS WILLARD, when the latter retires, July 1, 1946. Dr. Stoddard has been in his present position since July 1, 1943.

At the commencement at the University of Nebraska held on May 25, 1945, the LL.D. degree was conferred on EDWIN RAY GUTHRIE, professor of psychology at the University of Washington at Seattle. Dr. Guthrie, who received his B.A. degree from Nebraska in 1907 and his M.A. in 1910, is the fifth psychologist with undergraduate training at Nebraska to receive an honorary degree from his Alma Mater, and the fourth President of the APA to be so honored.

PAUL R. RADOSAVLJEVICH, professor of experimental education, New York University, will be retired, August 31, after more than forty years as a student and member of the staff. On March 22, Dr. Radosavljevich presented to the university his library of some 15,000 volumes and an equal number of pamphlets and periodicals on education, to be known as the Dean Thomas M. Balliet Teachers Library, in honor of the late dean (1904-19) of the School of Pedagogy (now the School of Education).

The president of the Executive Council, Kappa Delta Pi, honor society in education, THOMAS C. MCCrackEN, dean, College of Education, Ohio University (Athens), has announced the following elections (among others) to the Laureate Chapter of the society: CARL EMIL SEASHORE, dean emeritus, Graduate School, the Iowa State University, psychologist of high rank whose studies of the psychology of music have been of signal value in the field of music education. Dean McCracken also announces that CHARLES H. JUDD, professor emeritus of education, the University of Chicago, and one of the first members elected to the Laureate Chapter, has accepted an invitation to prepare the society's annual lecture for 1946.



For distinguished service to the profession of speech pathology, CARL E. SEASHORE, dean emeritus, Graduate College, the State University of Iowa, has been named as the first recipient of an award by the American Speech Correction Association, the new "Honors of the Association."

Among the ninety-six fellowships recently announced by the John Simon Guggenheim Memorial Foundation is one to THEODORE C. SCHNEIRLA, associate professor of psychology, New York University, and associate curator of animal behavior, American Museum of Natural History, for studies of the relationship between instinct and learning in insects. Dr. Schneirla is now in Tehuantepec, Mexico, where he is studying the behavior of colonies of army ants. This is the second Guggenheim award to Dr. Schneirla.

LIEUT. SADIE AARON, USNR, director of guidance, testing, and special classes in the public schools of Houston (Tex.), is on leave of absence for service as psychologist in the psychiatric section, U. S. Naval Hospital, Norfolk.

WAYNE L. ALLEE, instructor in psychology, University of Colorado, has been appointed to an instructorship in psychology, Stephens College (Columbia, Mo.).

CHARLES SCOTT BERRY, chairman of the Bureau of Special and Adult Education, has retired from the staff of the College of Education, the Ohio State University.

WALTER V. BINGHAM, chief psychologist in the Classification and Replacement Branch of the War Department, gave an address on "Psychology and the War" before the Canadian Psychological Association during its annual convention which was held in Montreal on May 28 and 29.

ARTHUR BURTON, formerly with the California State Personnel Board, has been appointed Senior Clinical Psychologist with the California Youth Authority.

NORMAN CAMERON of the University of Wisconsin, and S. J. BECK, of the Psychology Laboratory of the Michael Reese Hospital, Chicago, Illinois, have resigned from the editorial board of the *Journal of Clinical Psychology* in protest against the discriminatory editorial statement in the first number of that journal regarding the selection of trainees for clinical psychology.

CHARLES M. DISERENS has been promoted to a professorship at the University of Cincinnati.

HAROLD O. GULLIKSEN, of the University of Chicago, has been appointed professor of psychology at Princeton University and Research Secretary of the College Entrance Examination Board.

JOHN A. IRVING has resigned his position as professor and head of the department of philosophy and psychology, University of British Columbia, to accept an appointment, effective July 1st, as professor of ethics and social philosophy, Victoria College, University of Toronto.

ARTHUR F. JENNESS has resumed the chairmanship of the department of psychology at the University of Nebraska after having been relieved from active duty as an officer in the Army Air Corps.

CLIFFORD E. JURGENSEN, formerly chief psychologist of the Kimberly-Clark Corporation, has been appointed personnel director of the Minneapolis Gas Light Company. He took up this work on May 15.



*New Program in Personnel Relations at Ohio State.* Ohio State University has announced a new university-wide program of research, service, and instruction in personnel relations, planned to meet current and future problems of business, labor, industry, education, and government in Ohio. A Personnel Research Board made up of representatives of the various colleges, with Vice President HARVEY H. DAVIS as *chairman*, Professor CARROLL L. SHARTLE, as *secretary*, has been established; HAROLD E. BURTT is one of the *members* of this Board. An advisory committee of leaders in business, industry, education, and government is also being established. The research now in progress or planned for the future centers about the following topics: Personnel practices for small business, Worker attitudes, Scope of personnel administration, Organization and executive leadership, Combating absenteeism, Executive and supervisory talents, Job potentialities in Ohio, Job analysis for distributive industries, Practical problems of wages, Sales engineering, Graduate and undergraduate engineers, Re-engineering jobs for the handicapped, Tool engineers, Interviewing and counseling, Supply and demand of personnel workers, Jobs in radio and television, Learning to fly, and the Physical and mental health of teachers.

*Surveys on the Effects of Noise Abatement.* F. KENNETH BERRIEN and CLARENCE W. YOUNG, of the department of psychology, Colgate University, have been assigned by the University to conduct extensive surveys in manufacturing establishments on the effects of sound quieting on workers and production, under the auspices of the National Noise Abatement Council and the Acoustical Materials Association. The surveys conducted in six eastern states will place special emphasis on determining the effects of noise reduction on health, accidents, speed and quality of output, absenteeism, employee turnover and general morale. To determine the kinds of factory noise for which acoustical treatment gives the greatest benefits and the levels at which such treatment is most effective, studies will be made in a specially equipped laboratory at the university. In addition, through records, interviews, and morale questionnaires, studies will be made in various industrial plants before and after sound reduction is introduced.

*Examinations for Research Assistant and Junior Research Assistant.* The Board of Examiners of the Board of Education of the City of New York has issued a Preliminary Announcement of Examinations to be held in the early Fall of 1945 for license as Research Assistant and Junior Research Assistant in the Bureau of Reference, Research and Statistics. These are open to both men and women who must be able to plan and conduct educational research and testing projects and to analyze and interpret the data resulting therefrom. For Research Assistant, the applicant must be between 28 and 45 years, with a Bachelor's degree and 60 semester hours of approved graduate courses, of which 40 must be in the field of psychological and educational measurement, statistical methods, educational psychology and educational research, together with eight years of experience in teaching and educational research. The Junior Research Assistant must be between 24 and 40 years, have 30 semester hours in approved courses, of which 24 hours must be in the fields listed above, together with three years of experience in teaching and one year of approved experience in educational research. The salary of Research Assistant is \$5,000 and of the Junior Research Assistant \$3,500. Appointments are made from an eligible rank list. Requests for information, which must be in written form should be addressed to VESTA F. DAVIS, Chairman, Committee on Research Licensing, Board of Examiners, Board of Education, 110 Livingston Street, Brooklyn 2, N. Y., and should include a large self-addressed envelope with adequate postage.



# Psychological Bulletin

## THE AIRCRAFT PILOT: 5 YEARS OF RESEARCH

### A SUMMARY OF OUTCOMES\*

MORRIS S. VITELES, *CHAIRMAN*

*Committee on Selection and Training of Aircraft Pilots*

In 1939 the Civil Aeronautics Authority (now the Civil Aeronautics Administration) undertook an ambitious program of training civilian pilots. The purpose of this was to make young men and young women air-minded and to prepare the present generation of young people to fly the private and commercial planes of the future. This program, known as the Civilian Pilot Training program, was operated through the universities of the country, making use of already established facilities in the hands of private operators while encouraging others to set up similar facilities.

The first phase of the Civilian Pilot Training program called for instruction of 10,000 pilots, which was quickly expanded to the number of 50,000. Almost simultaneously with the formulation of the program, largely through the efforts of Robert Hinckley, at that time Chairman of the Civil Aeronautics Authority and Dean R. Brimhall, Director of Research, funds were set aside for research on selection and training of civilian aircraft pilots. This was done in the belief that an extended program of civilian pilot training should make use of every possible scientific aid for selecting those most competent to fly; for determining the best methods of training; for the appraisal of flight achievement, and for safe-guarding the adjustment of the pilot. Moreover, it was recognized that this large scale training program provided unusual opportunities for renewing the study of problems related to the human side of aviation which had been initiated during World War I and abandoned almost immediately with the signing of the Armistice.

### HISTORY AND OBJECTIVES OF THE COMMITTEE ON SELECTION AND TRAINING OF AIRCRAFT PILOTS

In keeping with the operating philosophy of the Civil Aeronautics Administration, it was decided to undertake such research through existing agencies rather than to build and equip government operated research centers for this purpose. The National Research Council was therefore asked to establish a committee for the administration of research with funds allotted from the budget of the Civil Aeronautics Administration. In seeking the cooperation of the National Research Council, Mr. Hinckley wrote:

It is the desire of the Civil Aeronautics Authority to have the advice of scientific people in the field of psychology and physiology in making these studies. Furthermore, the authority does not want to set up any new research laboratories, or any organization of its own to do so, but desires to use existing facilities at universities. We request, there-

\* Prepared for the Annual Meeting of the National Research Council Committee on Selection and Training of Aircraft Pilots, Washington, D. C., June 30, 1945.



fore, the assistance of the National Research Council, and ask that a committee be made up of men primarily from the Division of Anthropology and Psychology of the National Research Council to advise us in the procedure, including the best methods of distributing the financial help to the university laboratories at which such work will be done, the selection of the personnel to do the work, and similar problems. (Letter of 9/16/39.)

On the basis of this request, in the fall of 1939, the National Research Council appointed the Committee on Selection and Training of Civilian Aircraft Pilots (now the Committee on Selection and Training of Aircraft Pilots—CSTAP) including in its membership psychologists, physicians, physiologists, engineers, pilots, and representatives from the military services.

The present membership of the Committee\* (June 30, 1945) includes M. S. Viteles, Ph.D., *Professor of Psychology, University of Pennsylvania*, Chairman; Commodore J. C. Adams, (M.D.), *Chief, Division of Aviation Medicine, Bureau of Medicine and Surgery, U. S. Navy*; E. C. Andrus, M.D., *Chairman, Committee on Medical Problems in Civil Aviation, National Research Council*; Conrad Berens, M.D., *Director, Ophthalmological Foundation, Inc.*; H. R. Bohlman, M.D., *CAA Medical Examiner*; C. W. Bray, Ph.D., *Associate Professor of Psychology, Princeton University*; Technical Aide, *NDRC Applied Psychology Panel*; D. R. Brimhall, Ph.D., *Director of Research, Civil Aeronautics Administration*; Leonard Carmichael, Ph.D., *President, Tufts College*; Chairman, *Division of Anthropology and Psychology, National Research Council*; Cdr. J. W. Dunlap, (Ph.D.), *Aviation Psychology Branch, Division of Aviation Medicine, Bureau of Medicine and Surgery, U. S. Navy*; *Director of Research, CSTAP, 1941-42*; Col. J. C. Flanagan, (Ph.D.), *Chief, Psychological Branch, Office of Air Surgeon, Hdqs., AAF*; F. Fremont-Smith, M.D., *Director, Medical Division, Macy Foundation*; Maj. Gen. D. N. W. Grant, (M.D.), *Air Surgeon, Hdqs., AAF*; J. C. Hunsaker, Sc.D., *Head, Department of Mechanical Engineering and Department of Aeronautical Engineering, Massachusetts Institute of Technology*; Cdr. J. G. Jenkins, (Ph.D.), *Head, Aviation Psychology Branch, Division of Aviation Medicine, Bureau of Medicine and Surgery, U. S. Navy*; Chairman, *CSTAP, 1939-40, 1941*; *Director of Research, CSTAP, 1940-41*; H. M. Johnson, Ph.D., *Professor of Psychology, Tulane University*; Capt. W. E. Kellum, (M.D.), *Division of Aviation Medicine, Bureau of Medicine and Surgery, U. S. Navy*; H. S. Liddell, Ph.D., *Professor of Psychology, Cornell University*; Chairman, *CSTAP, 1940-41*; Brig. Gen. J. F. McBlain, *Army Air Forces*; W. R. Miles, Ph.D., *Professor of Psychology, School of Medicine, Yale University*; Brian O'Brien, Ph.D., *Professor of Physiological Optics, Director of the Institute of Optics, University of Rochester*; P. J. Rulon, Ph.D., *Professor of Education, Acting Dean, Graduate School of Education, Harvard University*; C. L. Shartle, Ph.D., *Professor of Psychology, Ohio State University*; L. B. Tuckerman, Ph.D., *Division of Mechanics and Sound, U. S. Bureau of Standards*; A. D. Tuttle, M.D., *Chief Medical Inspector, United Air Lines*; G. R. Wendt, Ph.D., *Professor of Psychology, Head, Department of Psychology, University of Rochester*. The following were also members of the Committee sometime during the past five years: Commander D. J. Brimm, *U. S. Navy*; Dr. Alexander Forbes, *Harvard University*; C. E. Guthe, *Division of Anthropology and Psychology, National Research Council, (ex officio)*; Commander Eric Liljencrantz, *U. S. Navy*; Dr. R. A. McFarland, *Harvard University*; Captain G. R. Murray, *U. S. Navy*; and L. Povey, *Chief Pilot Inspector, Civil Aeronautics Administration*.

Through an active Executive Subcommittee this group has for over five years conducted research at approximately 40 universities and other centers,

\* Members of the Executive Subcommittee are: M. S. Viteles, Chairman; E. C. Andrus, C. W. Bray, D. R. Brimhall, Leonard Carmichael, J. W. Dunlap, J. C. Flanagan, H. M. Johnson, W. E. Kellum, W. R. Miles, P. J. Rulon, and G. R. Wendt.



including military establishments, scattered from coast to coast and from the Lakes to the Gulf under grants from the Civil Aeronautics Administration amounting to approximately \$900,000.\* The program has utilized not alone the skills of research men and resources of these universities where basic research projects were established, but has enjoyed the help of hundreds of other men and women and has made use of the facilities of almost 600 other centers participating in the activities of the Committee on Selection and Training of Aircraft Pilots. Research returns have been greatly extended through the contribution of such services and facilities by universities and other centers cooperating in the research program organized and supervised by the Committee on Selection and Training of Aircraft Pilots.

In general, the operation of the Committee on Selection and Training of Aircraft Pilots (Exhibit 1) represents a striking example of research supported by a Federal agency which has allowed a unique amount of freedom from administrative restrictions while providing continuous stimulation and judicious oversight. For this, special credit is due to Dean R. Brimhall, Director of Research, Civil Aeronautics Administration. In addition, acknowledgment is owed to members of the Executive Subcommittee, a group of highly competent scientists who have given freely of their time and of their skill in planning and directing the research program, and to the project directors who administered the research activities. The outcomes summarized in the attached report truly represent the cooperative achievements of scientists, practical pilots, and administrators (both civilian and military) utilizing the resources and facilities of government and private agencies in the interest of the aircraft pilot.

#### AN ANALYSIS OF RESEARCH OUTCOMES

Plans for research were initiated in the fall of 1939 immediately after the appointment of the Committee on Selection and Training of Aircraft Pilots.

\* Cooperating research centers and project directors include: *University of Alabama*, C. P. Seitz; *Brooklyn College*, H. A. Witkin; *Brown University*, Carl Pfaffmann; *University of California*, Berkeley, Calif., E. E. Ghiselli; *University of California*, Los Angeles, Calif., R. M. Dorcus; *University of Colorado*, T. W. Howells; *Cornell University*, H. S. Liddell, Richard Parmenter, A. L. Winsor; *George Washington University*, J. P. Foley, Thelma Hunt; *Harvard University*, R. A. McFarland; *University of Illinois*, T. W. Harrell; *University of Indiana*, W. N. Kellogg; *Iowa State College*, J. E. Evans; *State University of Iowa*, C. E. Buxton, K. W. Spence, Don Lewis; *University of Kansas City*, Lorenz Misbach; *University of Maryland*, R. M. Bellows, J. G. Jenkins, J. W. Macmillan, A. C. Williams; *Massachusetts General Hospital*, Stanley Cobb, J. E. Finesinger; *Massachusetts Institute of Technology*, C. S. Draper, Walter McKay; *University of Michigan*, E. B. Greene; *University of Minnesota*, M. A. Tinker; *Naval Air Station*, Pensacola, Fla., R. A. McFarland; *New York University*, Raymond Franzen, D. H. Fryer; *New York Psychiatric Institute*, Carney Landis; *University of North Carolina*, F. N. Low, Dorothy Rethlingshafer, R. J. Wherry; *Northwestern University*, A. R. Gilliland; *Ohio State University*, H. A. Edgerton, R. Y. Walker; *Pennsylvania State College*, W. M. Lepley; *University of Pennsylvania*, M. S. Viteles; *Purdue University*, E. L. Kelly, Joseph Tiffin; *University of Rochester*, J. W. Dunlap, Brian O'Brien, H. S. Odbert, J. D. Page, M. J. Wantman; *Springfield College*, Leonard Larson; *Stanford University*, J. K. Lewis, Eric Liljencrantz, E. K. Strong, Craig Taylor; *University of Tennessee*, R. Y. Walker; *Tulane University*, H. M. Johnson; *University of Utah*, M. W. Lund; *Vanderbilt University*, N. L. Munn; *University of Virginia*, F. A. Geldard; *Wesleyan University*, G. R. Wendt; *Williams College*, Stanley Cobb, J. E. Finesinger; and *Yale University*, W. R. Miles.



A major objective of the Committee on Selection and Training of Aircraft Pilots and of the Civil Aeronautics Administration is the wide application of research results. This review is written chiefly for the purpose of bringing into focus the useful outcomes of research. In this connection, it should be pointed out that, in some instances, the useful outcomes were in the form of negative findings which perhaps helped to avoid the imposition upon the military services and upon the CAA of costly and cumbersome procedures which would drain available resources without adequate return.

As might be expected, not all of the research activities and investments have been productive of useful outcomes. In some instances, it was found impossible or impracticable to follow up promising leads and thereby to bring potential outcomes to full fruition. In other cases, situations beyond the control of the research project director, such as the unavailability of criterion data, or sudden changes in training plans made by governmental or other agencies, produced insuperable handicaps to the attainment of research objectives. In still other instances, the original experimental design, apparatus, administrative procedures or methods of analysis were inadequate for solving the problem under investigation. There are also projects which have failed either to turn in any final report or to provide a report of the type from which it is possible to evaluate the research findings and the possibility of applying them to meet the needs of military and civilian aviation.

In this review attention is focused upon useful outcomes. Nevertheless, it seems proper, in order to provide a basis for a complete evaluation of the research program, also to include references to those projects which have not made an appreciable contribution to the improvement either of research or of operating procedures.

### PILOT SELECTION AND CLASSIFICATION

In the research program of the Committee on Selection and Training of Aircraft Pilots, considerable attention has been given to problems of pilot selection and classification. This was particularly true during the first few years of research, when the country was faced with the problem of building up a large force of pilots for both civilian and military aviation. Moreover, while the emphasis during the past few years has shifted to other areas, particularly to research in pilot training, current investigations are still concerned with problems of selection.

Research on selection has ranged from exploratory studies involving a large number of psychological and physiological tests to the detailed analysis of specific predictors. Practical outcomes have included:

1. the validation of a number of predictors for use in both military and civilian aviation;
2. the accumulation of data on predictors which, although not fully validated, represent promising instruments for further research and application;
3. the identification of tests and other techniques which, while having apparent face validity or originally recommended for other reasons, proved upon investigation to lack reliability or validity;
4. the identification of predictors which, although valid, represent uneconomical techniques for the selection and classification of pilots.

### *General Outcomes of Research on Pilot Selection and Classification*

*Contributions to Military Aviation.* One major practical outcome of the Committee research program is the fact that by 1941, when the United States



entered the war, the research program had already produced test material and findings which were used by the U. S. Navy in setting up procedures for the selection of pilots. At the Annual Meeting of the Committee on Selection and Training of Aircraft Pilots, held in 1943, Cdr. (then Lt. Cdr.) J. G. Jenkins, in discussing the Navy research program, reported that

We are now using in routine selection, both before and after the beginning of training, three tests. Those three tests were either developed by the Committee first of all as selective agencies in aviation, or were developed by the collaborative efforts of the Committee and the Navy.

The selection program of the Army Air Forces has also profited from Committee research. Reference to this fact is found in the following quotation from an address given by Col. (then Lt. Col.) John C. Flanagan at the 1943 Annual Meeting of the Committee on Selection and Training of Aircraft Pilots:

We have learned a great deal from the work of the Committee. Much of our original planning was based on what the Committee had done, and in the past two years we have continued to profit. . . . Our program, set up two years ago in December of 1941, was built on what we could find out about what the English and the Canadians had done, and the considerable amount of work which had been done by the Committee here.

*CAA-National Testing Service.* Within the Civil Aeronautics Administration, the work of the Committee on Selection and Training of Aircraft Pilots in pilot selection found its most direct practical expression in the establishment of a National Testing Service (1942-43).<sup>\*</sup> The National Testing Service (133, 137, 138, 139) was designed to provide uniform administration and scoring, on a nation wide basis, of tests for screening candidates for training in the Army phase of the Civilian Pilot Training program. Through this service, centralized at the University of Rochester, 67,067 candidates for pilot training, reporting to 571 coordinators scattered throughout the United States, were tested by 609 cooperating examiners. The administrative cost of this program was borne by the Civil Aeronautics Administration through a special contract at a cost of approximately \$75,000. This means that the Committee conducted screening at the extremely low cost of a little more than one dollar per candidate.

In passing, it should be noted that the CAA-National Testing Service exemplifies the close integration between military and civilian applications in the work of the Committee on Selection and Training of Aircraft Pilots, since results of experimentation by the U. S. Navy were considered in the selection of tests for the screening program and in setting the cutting scores on each test. Moreover, this practical screening program has further reinforced the research program of the Committee in providing data on the extent to which the tests predict differential performance of those who meet minimum standards, and in furnishing significant findings on interrelationships among the tests (133), on differences among applicants for primary, secondary, and glider training (139), and on the influence of such factors as education, age, geographical area, etc., upon selection and upon achievement in learning to fly (133).

#### *Specific Outcomes of Research on Pilot Selection and Classification*

The broad, practical outcomes of Committee research in pilot selection and classification have been presented above. Detailed outcomes will be outlined

<sup>\*</sup> Throughout this report the dates in parentheses represent the years in which funds were made available to the research activity.



in the form of a brief discussion of specific areas of research, of individual predictors, and of their usefulness in the selection and classification of military and civilian pilots.

*Inventory of Personal Data for Prospective Pilots.* This test, generally known as the Biographical Inventory (B.I.), was the immediate outgrowth of work done (38, 43, 66, 106) at Purdue University (1939-40), although investigations at the Naval Air Station, Pensacola, Florida, at Tulane University (1940-41) and at the University of North Carolina also included the analysis of biographical data (36).

The Biographical Inventory (B.I.) represents one of the first, if not the first, successful attempt to predict pilot proficiency from biographical data. Besides serving as one of the basic instruments in the aviation cadet selection program of the U. S. Navy, the Biographical Inventory (B.I.) has also provided items for similar tests employed in the Army Air Forces.

The Biographical Inventory (B.I.) was also used to advantage in the CAA-National Testing Service (66, 106, 133, 137, 138, 139) and in the Standard Testing Program (1942), an extended research project involving the voluntary cooperation of 46 psychologists, scattered throughout the country, in the validation of a basic battery of predictors.

*General Intelligence Test.* A large scale study conducted in cooperation with the U. S. Navy at the Naval Air Station, Pensacola, Florida (1940-41) indicated the value of using a standard intelligence test in pilot selection (26, 57). Such a test was used by the Navy until it was replaced by the Aviation Classification Test. Because of the nature of both Committee and Navy research results, the test was included in the screening battery used by the CAA-National Testing Service (133, 137, 138, 139). The test is now in use in matching candidates for training in the current research program of the Institute of Aviation Psychology, University of Tennessee, established in 1943 through the cooperation of the Civil Aeronautics Administration, the National Research Council Committee on Selection and Training of Aircraft Pilots, and the Bureau of Aeronautics, State of Tennessee.

*Aviation Classification Test.* Items for this test were prepared by the U. S. Navy. Work on item analysis, on construction of alternate forms, and on determining the reliability of the test was carried on as a research project of the Committee on Selection and Training of Aircraft Pilots (1942) at the University of Rochester. The test was later incorporated by the Navy into the Navy pilot selection battery.

*Mechanical Comprehension Test.* The Mechanical Comprehension Test was included in research conducted in the Midwest Project (1941-42), in the Boston Project at Harvard University (1941-42), and also in the Standard Testing Program. Prior to the completion of these studies, this test was included in the battery used by the CAA-National Testing Service on the basis of experimental findings provided by the U. S. Navy. Results available from the Midwest and Boston studies provided evidence on the usefulness of this test for initial selection (65, 104, 115). The analysis of CAA-National Testing Service data has furnished interesting information on the relationship of this test to other predictors, as well as to age, geographical area, etc. (133). The Mechanical Comprehension Test is one of the battery employed in matching research groups at the Institute of Aviation Psychology, University of Tennessee.

*Psychomotor Tests.* The Pensacola Study of Naval Aviators furnished evidence on the value of three psychomotor tests, viz., the Mashburn Serial Action Test (55), the Eye-Hand Coordination Test, and the Two-Hand Coordination Test (56) in differentiating "good" from "poor" pilots, including washouts and



those who had Board appearances (57). The Committee on Selection and Training of Aircraft Pilots cooperated in producing an improved model of the Two-Hand Coordination Test, later adapted for use in the early experimental program of the Army Air Forces, which led to the extended use of psychomotor tests in the classification of Army aircrew personnel. In addition, according to a research report by Lt. Col. A. W. Melton, appearing in the *Journal of Aviation Medicine* (1944, Vol. 15, pp. 116-123), the Rotary Pursuit Test "was originally introduced in the psychomotor classification battery (of the Army Air Forces) on a hunch supported by a bit of data which had come from a study sponsored by the National Research Council Committee on Selection and Training of Aircraft Pilots" (28, 30).

While the number of cases was small, the Midwest Project (91, 93, 96) and the Boston Project (54, 105, 115) of the Committee on Selection and Training of Aircraft Pilots have produced further evidence on the validity of the Mashburn Serial Action Test and of the Two-Hand Coordination Test for pilot selection. These tests are also currently being used in connection with research at the Institute of Aviation Psychology, University of Tennessee.

Productive cooperation with the Army Air Forces is illustrated in service rendered by the Committee staff in connection with a special experimental program for the investigation of psychomotor tests conducted at the University of Rochester and at the University of Buffalo (1943). Studies at the State University of Iowa (1942-44) on the effect of lateral distraction lights on performance on the Mashburn Serial Action Test, conducted in close collaboration with the staff of the School of Aviation Medicine, AAF, have produced results on learning rate and on reliability of performance under differing procedures of administration (63), of practical interest in the Army Air Forces Testing Program. There has also been cooperation with the Army Air Forces on research conducted at the State University of Iowa (1942-44), concerned with the effect of various combinations of work and rest periods on (a) the rate and level of performance, (b) the reliability of scores, and (c) the intercorrelations among scores based on different learning segments for the Rotary Pursuit Test (72) and the Two-Hand Coordination Test (73). In another study, made at the request of the staff of the School of Aviation Medicine, AAF, with the cooperation of the U. S. Navy, attention has been centered on the validation, in relation to learning to fly, of initial, terminal, and segment scores obtained through the administration of a variety of psychomotor tests (4).

In the case of a number of the psychomotor tests referred to above, the Committee on Selection and Training of Aircraft Pilots has also made a practical contribution through improvements in apparatus used in Committee research, in providing drawings and wiring diagrams, and in the standardization of apparatus and procedures for administering the tests (55, 56).

*Statistical Developments.* Studies sponsored by the Committee on Selection and Training of Aircraft Pilots have also led to the refinement of methods for selecting combinations of predictors and determining the best cut-off points through the use of multiple chi (20). Various memoranda devoted to a discussion of such techniques have been prepared (22, 23, 24) and made available to research workers in both military and civilian aviation. These include an analysis of results obtained from the use of multiple chi as compared with those obtained from use of multiple correlation techniques (114, 118, 120), using results from the Standard Testing Program (107, 108, 111, 112). Interesting statistical developments are also to be found in steps taken for the scoring, analysis and interpretation of physiological data (18, 19, 25, 49).

*Physiological Tests.* An important practical outcome of Committee research



bears on relationships between physiological measures and pilot performance. Of 21 physiological items included in the Pensacola Study of Naval Aviators, vital capacity and the smallest pulse pressures subsequent to tilt proved to be the only items showing promise in the differentiation of "good" pilots and "poor" pilots, including washouts and Board appearances. Even these measures failed to differentiate the criterion groups at an accepted level of significance (18, 26, 57).

Analysis of the Pensacola data drew attention to the significant fact that the low validity of the physiological tests studied may be a function of low reliability in the sense that the test as administered provided merely a measure of a biological instant not consistently representative of the physiological function extending over a long period of time. Similar findings on unreliability of physiological measures were obtained in other studies at Harvard University (105, 115). Constructive outcomes of such findings appear in the steps which have been taken towards the exhaustive analysis of respiratory measures, with a view to arriving at items that give sufficiently consistent measures to permit their further use in the determination of validity for pilot selection or in the maintenance of pilots (25).\*

While many items were included in the studies of physiological measures, independent and extended treatment has been given to the electroencephalogram, somatotypes, visual measures, and to certain cardiovascular functions in investigating the relationships with achievement in learning to fly.

*Electroencephalography.* Records were obtained in studies (1940-41) at Harvard University (17, Supplement), Massachusetts General Hospital (15) and Naval Air Station, Pensacola, Florida (17, 21, 57). Results were not sufficiently promising to warrant the recommendation that this elaborate technique be included in a pilot selection battery.

*Somatotyping.* Somatotype measures obtained in the Pensacola Study were subjected to an extended statistical analysis (21, 57). The results showed the need for further investigation and cross validation of somatotyping techniques on less selected populations before the procedures could be recommended for use in the selection of aircraft pilots.

*Visual Functions.* An analysis of the relationship between visual functions and the achievement of RAF cadets in learning to fly (1941-44) has led to the tentative conclusion that visual deficiencies, such as are accepted by the RAF, are not related to achievement in learning to fly (3). The findings and conclusions are entirely tentative because of the fact that early eliminations were not included in the investigation. The study is now being repeated on another population of RAF cadets which does include early eliminations. The final findings and conclusions will have an important practical outcome in providing experimental evidence as a basis for arriving at decisions with respect to lowering the visual standards in the certification of pilots in this country.†

\* It should be noted that the relationships between physiological measures and pilot performance over extended operational periods have not so far been studied in Committee research.

† A further development of research in this area is a recent request from the Civil Aeronautics Administration, at the initiation of the Civil Aeronautics Board, that the Committee on Selection and Training of Aircraft Pilots undertake further studies of the relationship between visual measures and flight performance to provide experimental data of significance in the certification of private pilots.



*Physical Fitness.* Experiments (1939-42) at Stanford University (75, 76, 77), supplemented by exhaustive statistical analyses, have pointed to the inadequacies of the Schneider Index and to the need for simpler and more reliable measures of physical fitness (19, 24). These studies have been marked by the use of statistical techniques peculiarly applicable to this problem. The results of the investigations were made available to the U. S. Navy for use by this service in connection with a program designed to develop simplified and improved tests of physical fitness. The Committee program has included plans for further work in this area designed to lead to practical results in the formulation of standards for the certification of civilian pilots.

*Studies of the Interview.* Since considerable emphasis had been placed on the interview as a method of pilot selection, a standardized interview and rating procedure (Exhibit 2) were developed, and extensive investigations of the interview (1941-43) carried out under the auspices of the Committee at Wesleyan University, Harvard University, Ohio State University, Purdue University, and the University of Michigan (8, 116, 121). The economic aspects of research conducted by the Committee are illustrated in the conclusion that the contribution of even a reliable interview appears to be slight in terms of the time, effort, and cost involved in the interview procedure, since it adds little to the predictive information obtained through the use of much less expensive and more easily administered paper-and-pencil tests.

A study of the psychiatric interview used in the Massachusetts General Hospital Project (1940-42) revealed little promise for this particular type of interview (15). However, measures of the interaction between interviewee and interviewer, as recorded on the interaction chronograph, showed promise and this technique has been subjected to further validation in the examination of aviation cadets at Williams College (14), conducted through the cooperation of the U. S. Navy (1943-44).

*Among the practical outcomes of Committee research are several new tests and other predictors which, although not fully validated, appear to represent promising materials for future research and possible use.* The following may be included in this category.

*Test of Aviation Information.* This test was developed (1941-43) in the research program of the Committee on Selection and Training of Aircraft Pilots at the University of Rochester (107, 110, 113). Preliminary results on the test were obtained in the Standard Testing Program (108, 109, 111). The test was released to the U. S. Navy for further research and also used by the CAA-National Testing Service for the selection of applicants for flight training. A comparison of the test results with achievement in learning to fly indicates that it can be included among the more promising predictors developed in the Committee's research program (133).

*Personal History (P-H) Inventory.* This test was originally developed largely through the cooperation of the staffs at the University of Rochester and Wesleyan University (1941-43) for use in connection with the study of the aviation interview (8). Scoring keys, data on reliability, and some preliminary data on validity are available from the Standard Testing Program (46). The test is now being used in connection with research at the Institute of Aviation Psychology.

*Desire-to-Fly (D-F) Inventory.* This test was developed in research conducted at the University of Rochester (1941-43). Scoring keys and data on validity are available from studies at the University of Rochester (44) and ad-



Name of Candidate \_\_\_\_\_  
 Name of Rater \_\_\_\_\_

## INTERVIEW CHART

## D. DESIRE TO FLY

25	20	15	10	5	1
AN ARDENT, IRREPRESS- IBLE DRIVE TO BE- COME A FLYER	A STRONG INTEREST IN FLYING	A MILD INTEREST IN FLYING	ONLY A SLIGHT INTEREST IN BECOMING A FLIER	NO FUNDAMENTAL INTEREST IN FLYING	
_____ has a very strong _____ and sincere _____ interest in _____ becoming a _____ flier; _____ would rather _____ fly than eat; _____ bubbling over _____ with enthusiasm _____ for flying; _____ knows a lot _____ about flying _____ already; _____ can't wait _____ until he gets _____ in the air; _____ heart is set _____ on flying; _____ has always _____ wanted to fly	_____ has a genuine _____ desire to fly; _____ wants very much _____ to fly; _____ has paid for _____ flying _____ instruction; _____ has read widely _____ about aviation	_____ would like to _____ be a flier; _____ is an average _____ candidate; _____ has a moderate _____ desire to _____ become a flier	_____ is nonchalant _____ about flying _____ as a career; _____ prefers other _____ things to _____ flying; _____ is prompted _____ primarily by _____ money	_____ has pseudo- _____ interest in _____ becoming a _____ flier; _____ is a "draft- _____ dodger"; _____ drifted into _____ flying; _____ flying is a _____ means to some _____ other end; _____ is only curious _____ about flying	
EXPLANATION OF RATING:					
_____					
_____					
_____					
_____					



ditional data are being accumulated through the use of the test at the Institute of Aviation Psychology.

*"Ability-to-Take-It" Tests.* The investigation (1940-43) of tests designed to measure "ability to take it," conducted at the University of Rochester, Northwestern University, and the University of North Carolina, provided support for the point of view that this is not a unitary trait and produced a number of measures considered sufficiently reliable for use in further research (7, 30, 117, 119). Nine units of one of these tests, a Recording Dynamometer, have been purchased from the Committee on Selection and Training of Aircraft Pilots by the U. S. Navy for use in further research. However, a recent study (1943-44), involving an analysis of examiner differences in testing 550 Naval Aviation cadets at Williams College, has raised serious questions concerning the ultimate usefulness of the "Ability-to-Take-It" Tests (67).

*Stability of Orientation Test.* This test, developed at Brooklyn College (1942-44), yields a measure of a subject's ability to recognize changes in his lateral and longitudinal position with respect to the earth when the visual cues from his immediate environment are deliberately falsified through tipping or rotating a "room" to a position other than the horizontal (129, 130, 131). The test has been made available for validation by the Army Air Forces (1944). Progress has been made in the validation of this test on approximately 1000 aviation cadets. In addition, this test is being used in a program at Brooklyn College (1944), designed to determine the extent to which improvement in spatial orientation can be effected by training (132).

*"Self-Description" Test.* Each item in this "personality" test, developed at the University of North Carolina (1939-41), consisted of two descriptive phrases, one of which the subject was required to select as describing him better than the other (124). This arrangement of descriptive terms greatly reduced the subject's chance of inferring the correct answer to individual items, since both descriptive phrases constituting one item were frequently derogatory or commendatory. Preliminary validation data were obtained on Civilian Pilot Training students, but further work is needed to make this a practical addition to a test battery.

*Scholastic Grades.* Several studies of scholastic grades and flight performance (1940-41) showed little relationship of such grades to achievement in learning to fly (1). Further studies in this area may be of significance in formulating scholastic requirements for civilian pilot training. However, there has been no follow-up in this area of investigation.

*Included in Committee research on pilot selection and classification are investigations, undertaken particularly in the early or exploratory phase of the search, which produced generally negative or questionable results in terms of application.* Failure to arrive at practical outcomes resulted, in some cases, from the fact that the research projects were intended merely to select pre-dictors for further study. A study (1939-40) of 39 psychological and physiological tests at Purdue University (16), investigations (1939-40) at the University of Alabama (71), and several studies at the University of North Carolina (69, 125, 127) are representative of this group. Moreover, practically all such early investigations were handicapped by limitations of criteria and of size of sample. In other instances, however, as suggested in the Introduction to this report, failure to arrive at practical outcomes can be laid not to the exploratory nature of the research, but, at times, to defects inherent in the nature of the experimental design; at other times, to conditions not subject to control by



the investigator; and, in still other cases, to the fact that the investigators failed to provide adequate reports on the investigations conducted by them.

Work on the development of a key for the *Strong Vocational Interest Blank* for use in pilot selection was initiated (1939-40) under Committee auspices at Stanford University (74), and other studies on this instrument were conducted (1939-40) at Ohio State University (101) and at Purdue University (1939-41). However, such studies have not led to the recommendation that this instrument be used in selection batteries.

The *Humm-Wadsworth Temperament Scale*, *Guilford STDCR Test*, and the *Maslow Dominance Test* were investigated at various research centers, including Northwestern University (1940-43) and Purdue University (1939-40). Preliminary results indicated in general that these tests had little value as predictors of flight proficiency. However, questions regarding scoring procedure, criteria, and analysis of data rendered conclusions equivocal.

Studies of *interest and attitude scales* were conducted at George Washington University (1939), but inadequacies in design rendered it impossible to reach definite conclusions concerning the value of the measures analyzed (16).

Studies of the *Link Trainer (Contact)* as a device for selection and training of pilots were early undertaken at the University of Michigan (1939-41). Later, methods were developed at Harvard University (1941) for obtaining objective records of performance on this trainer, and further studies of the device were undertaken in the Boston Project at Harvard University (1941-42) and in the Midwest Project (1941-42). Preliminary data indicated that the reliability of scores obtained through methods devised in this research was too low to justify the use of the Link Trainer (Contact) for selection purposes (5, 60, 92). In general, findings from such studies proved to be ambiguous because of apparatus and administration difficulties, and, in some instances, because of inadequacies in reports on findings (5).

Apparatus was developed at the University of Colorado (1939) for testing *eye-hand-foot coordination* similar to that required for aircraft operation. Adjustments were required in response to flight situations projected on a screen. However, no data were presented in the report submitted by this project (33).

The *Seashore Serial Reaction Time Test* and the *Ranssen Coordinator* showed some slight promise in early investigations (1940-43) at Northwestern University (30), but further investigation of these instruments was never carried out.

*Snoddy Star Test*. This test was administered to subjects in the Standard Testing Program (45). While apparently showing some merit, the test has not been included in selection batteries, partly because of difficulties involved in administering the test.

The interrelationships of *cardiovascular-respiratory variables* were studied by factor analysis techniques at Springfield College (1940). Inadequacies in design and statistical treatment have prevented practical applications of this work (49).

*Projection Tests*. A number of projection tests were employed in a study conducted by the staff of the Massachusetts General Hospital, through the cooperation of the U. S. Navy, at the Naval Air Station, Squantum, Mass. (1940-42). While results on most of these tests (15), including a modification of the Rorschach, were negative, promising findings were obtained on a number of items which have recently been subjected to further study (1943-44), again through the cooperation of the U. S. Navy, in an investigation by the Massachusetts General Hospital group at Williams College (14). Criterion data fur-



nished on approximately 500 subjects are now being subjected to analysis at the University of Rochester.

### PILOT TRAINING

During the early years of the Committee on Selection and Training of Aircraft Pilots the major emphasis was on the development of improved methods for the selection and classification of pilots and on associated criterion problems. This emphasis was not only in accord with the needs of the time, but also a natural outcome of the fact that exploratory steps in the selection of pilots had been taken during World War I which provided some basis for immediate practical research by the Committee (134). During the past few years, as the selection situation in the military services became stabilized, the emphasis has shifted from research in selection to research in training. Here the Committee entered a field of investigation which was largely uncharted. As is apparent below, Committee activities in this area represent pioneering efforts which have produced new tools of importance both to civilian and military aviation.

In research on training, the Committee has considered two aspects of the training situation. The first centers around problems experienced by student pilots in learning to fly. Secondly, consideration has been given to the methods employed by instructors in teaching students, since the learning of the student is dependent upon methods used by the instructor. The latter naturally leads into problems of curriculum revision.

Practical outcomes from research in pilot training can be divided into two categories:

1. *the development of basic research tools and methods for use in the investigation and improvement of pilot training;*
2. *the development of training aids for field use.*

As might be expected, there is very close interrelation between these two categories since, in some instances, the availability of newly developed tools and methods led directly to practical applications, and in others, the development of new training aids led to further research productive of additional outcomes in the way of improved training methods. Following is a brief analysis of the major practical outcomes of research on pilot training, supplemented by a brief statement concerning incomplete research and areas in which anticipated outcomes have not yet been achieved.

*Development of "Patter" and "Fundamentals of Basic Flight Maneuvers."* One of the early and extremely fundamental research projects on pilot training was that carried on at Purdue University (1940-42). When Committee research was initiated, little or nothing was known about the nature of actual air instruction, since such instruction was generally conducted in a two-place plane, and student and instructor were in a situation where the instructional process could not be directly observed.

A short-wave transmitter and electrical interphone suitable for use in a light plane were developed. Through the use of these, *for the first time in history*, elementary flight instruction could be observed, and evaluated, in light of modern scientific and educational principles. By means of this equipment, instruction was transmitted to a receiver on the ground, recorded, and later transcribed. Over 100 hours of instruction, both at Civilian Pilot Training schools and at the Naval Air Station, Glenview, Illinois, were recorded. Qualitative and quantitative studies (10, 11, 41, 42, 78), besides indicating the good points of instruction, revealed many areas in which instruction could be improved.



One immediate outcome of this preliminary research was an opportunity to examine variations among instructors with respect to the vocabulary or terminology used in training pilots. For example, an analysis of 10 hours of instruction by each of 4 instructors revealed a total of 500 technical or specialized terms, many of which were unique to an individual instructor (41). In addition, it was found that (a) much instruction was given in the air which could better have been given on the ground, and (b) pilot training suffered from inadequate methods of presentation by instructors unaware of the fundamentals of good teaching procedures.

## PATTER FOR ELEMENTARY MANEUVERS

## 10. CLIMBING TURNS

C. A. B. No. 5: P. 153

C. A. B. No. 23: P. 61-62

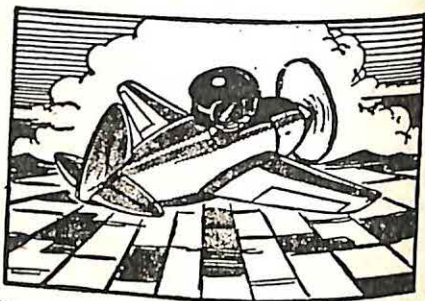
Talk over while gaining altitude. Check traffic.

Left climbing turn.

Turns may be executed in the normal and the maximum climb. In both of these, the turn is made with a shallow bank. The only difference is that the normal climb is accomplished with 100 engine R. P. M. above cruising speed, while the maximum climb is accomplished at full throttle, so a slightly greater angle of climb is possible.

We will first do a gentle, 90-degree left climbing turn. First after making sure that there will be no other planes in the way, open the throttle until the engine R. P. M. is approximately 100 R. P. M. above cruising. Then, assume a normal climb as we have done before.

Now, since we know that additional back pressure is needed in a turn, we decrease this angle of climb by approximately one-third. This will provide for the additional lift needed when we are



Point to left wing, Point to nose. Now we coordinate our controls until our left wing tip is in this relation to the horizon. You can see that it is the same as in a shallow-banked turn. Remember, we must keep the nose in its usual position during the turn.

As in our previous turns, we release our rudder and aileron pressure as soon as the turn is established, then apply slight opposite aileron pressure.

Recover. When we wish to recover from the turn, we coordinate our controls so as to stop the turn and the bank. At the same time we adjust the back pressure so that by the time we are flying straight we are back in a normal climb. O. K., now you take over and execute a climbing turn to the left.

EXHIBIT 3. SAMPLE PAGE FROM "PATTER FOR ELEMENTARY FLIGHT MANEUVERS"  
(Civil Aeronautics Bulletin No. 31)

These findings led first to the development of two training aids of fundamental importance for elementary instruction: (1) *Patter for Elementary Flight Maneuvers*, and (2) *Fundamentals of Basic Flight Maneuvers*.

*Patter* provides a model presentation of air instructions in basic maneuvers. As pointed out by E. L. Kelly, Project Director at Purdue University, who was largely responsible for the basic work on these and on a number of other aids considered in this report (42):

Behind the preparation of *Patter* was a very strong feeling that a student deserved at least one simple and complete description of each maneuver while in the air, preferably during the first time it was demonstrated to him. Analysis of actual recordings of flight instruction convinced us that such descriptions were not available in the spontaneous instruction given by instructors in the air. It was at this point we decided to prepare appropriate *Patter* for each of the maneuvers.

In the *Fundamentals* were outlined the basic facts which should be understood by the student pilot before going up for instruction in the various maneuvers. These, as in the case of *Patter*, were prepared in light of educational



principles, attention being given particularly to the definition of each new term as it was introduced.

Following many revisions and "flight testing" by experienced instructors, these training aids were presented to the Civil Aeronautics Administration and, following additional modifications by the staff of that agency, were published early in 1943 as *CAA Bulletins No. 31* (Exhibit 3) and *No. 32*, with an initial order of 20,000 copies.

Even before the publication of these materials by CAA, special revisions were prepared by the U. S. Navy with the aid of personnel provided by the Committee on Selection and Training of Aircraft Pilots. Acknowledgment of the manuals prepared for the use of the U. S. Navy by the training staff of the Bureau of Aeronautics, in cooperation with research personnel supplied by the Committee on Selection and Training of Aircraft Pilots, is found in a letter dated July 28, 1942, addressed to the Chairman of the Committee by Capt. (now Admiral) A. W. Radford which states in part:

The flight manual, originally written under the auspices of the National Research Council, has met with unanimous approval by flight personnel who have read the booklet, and it is felt that it will be of inestimable value in furthering flight training.

Among other practical outcomes in this area was a translation of the *Elementary Patter* into Chinese, prepared through the Division of Research, CAA. A preliminary edition of *Patter* and *Fundamentals* for secondary training was also prepared and submitted to the CAA, but this, so far as the records of the Committee show, has not led to CAA publication or use.

*Development of Air-borne Model Magnetic Wire Recorder.* The Committee deserves considerable credit in connection with the development and promotion of the Air-borne Model Magnetic Wire Recorder in aviation. This instrument was developed largely through the initiative of the Director of Research, CAA, and of the Project Director at Purdue University (1942), the latter serving as a consultant to the Armour Institute of Technology in the design and manufacture of the first model of this instrument (39). Mass production of the Air-borne Model Magnetic Wire Recorder was further stimulated through the efforts of the Division of Research, CAA, working in close cooperation with the Committee.

The Air-borne Model Magnetic Wire Recorder has proven of great value in research by the Committee and, in addition, is used in training activities by the U. S. Navy and the Army Air Forces. It has also become an extremely useful tool in Army and Navy operations through other applications which have apparently very advantageously affected the war effort. In view of the latter it is perhaps significant to note, as apparent from available correspondence, that the Air-borne Model Magnetic Wire Recorder and the possibilities inherent in the instrument were first brought to the attention of the military services, in October, 1942, by the Committee on Selection and Training of Aircraft Pilots through the Civil Aeronautics Administration.

*Development of the WTS Methods Training Course.* Analysis of flight instruction supported the conclusion that flight instructors should be good teachers, as well as good flyers, and that existing requirements for instructors, which placed almost complete emphasis on flying ability, were incomplete. The CAA War Training Service, becoming aware of this fact, requested the Committee, early in 1943, to develop a 30-hour course on the theory and techniques of flight instruction as a basic unit in the CAA Controlled Secondary Instructor Course and, in addition, to train selected personnel to give this course at training centers.



Such a course (90) was developed by Committee personnel. It represented an application to flight instruction of the outcomes of educational and industrial research on the learning and teaching processes (136), and of the results of findings from pilot training research conducted by the Committee on Selection and Training of Aircraft Pilots. It undertook to achieve an integration and organization of these established principles and research findings in such a manner as to furnish practical and effective guidance to flight instructors. This was done with a minimum of technical terminology, and with repeated and specific references to the flight situation.

Applying standards formulated by the Committee on Selection and Training of Aircraft Pilots, the Civil Aeronautics Administration selected a group of seven men known as "methods instructors" to take this course at an Institute conducted by Committee personnel at the University of Minnesota in April, 1943. These methods instructors were then assigned to CAA Instructor Training Centers to give instruction in teaching methods to those undergoing training as flight instructors. A second Institute, involving a group of 30 men assigned by CAA, was held at Ohio State University in the fall of 1943. Each man undergoing such instruction was provided with a comprehensive manual entitled *Lesson Plans for Training Methods Unit, CAA-WTS Controlled Secondary Instructor Course* and an Instructor's Kit which was then used as a guide in conducting training and teaching methods at Instructor Training Centers.

The materials for this course were turned over to the Army Air Forces and the U. S. Navy for use in developing similar instructor training programs. Copies have also been made available to the air forces of allied nations. There has been established in this course, and through the experience at the Institute, the basis for important postwar activity in improving the quality of flight instruction of civilian pilots. These materials represent a basic step in raising the level of professional skills, and such a course might well be established as a prerequisite in the licensing of pilot instructors as we move into the extended training of civilian pilots in the postwar era.

*Compilation of Instructional "Tricks."* Investigations of flight instruction showed the need for eliminating certain inadequacies in the procedures employed. These investigations also revealed that many special teaching techniques actually used by individual instructors in the field were of great value. It therefore seemed desirable to compile those special teaching methods which individual flight instructors had found by experience to be effective in dealing with specific problems of individual trainees and in teaching specific maneuvers. It also seemed well to make provisions for circulating such ideas to instructors throughout the country. For these reasons, a questionnaire was sent (1943-44) to 1000 flight instructors in the WTS Army and Navy programs, requesting each to describe methods he had found particularly useful in overcoming student pilot difficulties. Over 3000 techniques were compiled from replies to the questionnaire (12, 85) returned by approximately 100 flight instructors. These techniques are now being evaluated by civilian and Navy instructors. Upon completion of this evaluation it is intended to prepare a manual which may well become a valuable supplement to available flight instruction manuals. In the meantime a compilation of instructor "tricks," in preliminary form, has been made available to the U. S. Navy, the Army Air Forces, and the Royal Air Force.

*The outcomes of the major studies discussed above can be considered positive contributions in the area of pilot training. Equally significant results may be expected from training studies now in progress.*



One of the major difficulties encountered in conducting research in training lies in controlling conditions, e.g., selection of student pilots and rigorous control of types of instruction. The establishment of the Institute of Aviation Psychology at the University of Tennessee (1943) through the cooperation of the Committee on Selection and Training of Aircraft Pilots, the Civil Aeronautics Administration, and the State of Tennessee Bureau of Aeronautics was intended, in part, to overcome this difficulty. Here use is being made of the tools and techniques developed in Committee research described above in the investigation of specific problems in training, such as the relative effectiveness of training with and without instruments, variations among age groups in learning to fly, and factors involved in learning to land a plane. Such studies are directed primarily towards problems of civilian aviation, and the findings should be of particular significance for postwar aviation.

In addition to field research on general problems of pilot training, attention has been directed towards basic perceptual processes involved in learning to fly. In this connection, an extensive investigation of peripheral vision has been undertaken at the University of North Carolina (1942-44), centered on the development and evaluation of procedures for the improvement of peripheral visual acuity (51, 52). Another investigation at Brooklyn College (1943-44) has involved the study of methods for training subjects in perception of position, through use of the Stability of Orientation apparatus (132).

*Certain other investigations in the area of training, while not resulting in major contributions or immediate practical outcomes, have had some value as exploratory research.* Such studies are described below.

*Eye Movements and Visual Cues in Landing.* The attention of the Committee was early directed by the Director of Research, CAA, to the importance of investigating the role of visual cues in landing a plane. Exploratory work in this area was begun in 1939 at the University of Rochester. This resulted in the development of a photographic instrument suitable for such research and in certain preliminary findings on the patterns of eye movements of experienced and inexperienced pilots, respectively. Research under this project was not completed and no final report is available, but the investigation has served as a stimulus for similar investigations by other groups.

In an investigation at Brown University (1940), provision was made for a detailed introspective account of visual cues used both during flight and in landing, supplemented by an analysis of introspective accounts by other observers (79, Supplement). Initial steps were also taken for the development of photographic equipment and in planning further extended objective studies in this area. These studies were interrupted by the entry of the investigator into the Navy, where he has since conducted similar research. An exploratory study initiated in 1941 at Purdue University, involving the use of photographic equipment, indicated that there were no patterns of eye movements during landing which clearly differentiated experienced from inexperienced pilots although lack of adequate criteria prevented determination of the relationship between eye movements and excellence of landing (79). On the basis of the rather small sample of pilots studied it was suggested that the procedure of instructing the student to look at some specific place, and nowhere else, during landing was inadvisable, particularly since a few experienced pilots, who insisted that there was a proper place to look, actually did not maintain fixation on this suggested area during their own landings.

*Studies in Peripheral Vision.* An early study at the University of Minnesota (1939-40) attempted to determine the relationships between skill in landing



and disjunctive reaction time to peripherally presented visual stimuli (80). Lack of a clear criterion of landing proficiency represented the major limitation of this report, but the study has merit as an exploratory research.

*Air-Ground Time.* Early in the work of the Committee on Selection and Training of Aircraft Pilots attention was drawn to the amount of time spent on the ground and in the air, respectively, during flight periods as a possible source of significant variation in the training of aircraft pilots. As a result, in 1940, observations were made of the proportion of flight time spent on the ground and in the air as an incidental feature of larger investigations conducted at the University of Maryland and at Tulane University (135). Subsequently (1941-42), through projects at Kansas City University, Purdue University, and the University of Utah, the Committee initiated a major study (135), designed to provide through the use of a modified Servis Recorder extensive data on differences in the amount of time spent on the ground and in the air and on the influence of such factors as type of airport, instructor, student attitudes, etc. upon such variability.

Perhaps the most immediately important finding of this series of studies was that students undergoing instruction in relatively small private fields, used solely for civilian trainees, spent a significantly greater proportion of time during Stages C and D actually flying than did student pilots training at the large commercial airports. In general, the findings suggested the desirability of making instructors and operators aware of the need for considering special local situations which may result in excessively extending the amount of time spent on the ground during flight training.

In addition to providing such preliminary finding, the studies served to indicate the necessity of more exacting design and of larger samplings of airports, instructors, and students, if it seems desirable to do further work in order to answer with a greater degree of definitiveness the questions asked in initiating these studies on air-ground time.

*Analysis of Movements in Handling Controls.* In an investigation conducted at the University of Pennsylvania (1939-40) steps were taken to obtain objective data on coordinated patterns of limb and body movements employed in controlling the flight of a plane. Both direct observation and motion photography were employed for analyzing the details of limb and body movements and for determining differences in patterns of movements characterizing "superior" and "inferior" pilots. While this evaluation of flying habits in relation to plane performance was preliminary in character, it nevertheless represents an example of the application of the techniques of motion study to pilot performance and a source of data relevant to problems of training (88).

*Although designed as major investigations in the area of training, the two projects described below yielded no definitive outcomes.*

*Investigation of Form ACA 342A and of the Ohio State Flight Inventory as Training Aids.* This investigation, conducted as part of the Midwest-Navy Project (1942-44), yielded no meaningful results on training due to the practical impossibility of adequately controlling the instructional procedures at the several flight centers where the project was administered (95, 98, 99, 102).\*

*The Link Trainer as a Synthetic Training Device.* While there have been some indications that training on the Link Trainer (Contact) might be substi-

\* Other findings of this project, involving the comparison of inspector ratings, are, however, of practical value, and are described in the section on the evaluation of pilot performance



tuted for a limited number of hours of instruction in the air, experimental investigations in this area at the University of Michigan (1939-41) have so suffered from inadequate design and treatment and from ambiguous data as to render them of little or no practical value (5).

### EVALUATION OF PILOT PERFORMANCE

The Committee research program, from its very beginning, included the investigation of criteria of pilot proficiency. Studies have been devoted both to the evaluation of rating and grading methods actually used by instructors and inspectors and to the development of improved measures of pilot performance. The impact of this activity is apparent not only in the Civil Aeronautics Administration operating program but also in the work done on criteria by the military services.

Research on criteria has led to practical outcomes, detailed below, in:

1. *the development and evaluation of new instruments and techniques for the analysis of pilot performance both for research purposes and for field use;*
2. *the evaluation and improvement of commonly used methods for assessing pilot proficiency.*

#### *Development of New Techniques*

*Standard Flights.* One major practical outcome of Committee research on criteria has been the application of the concept of standardized test situations to aviation through research at the University of Pennsylvania (1939-43). Through this project, the Committee research program has provided, for use in the air, standard patterns of maneuvers analogous to the standard series of driving operations used both by civilian agencies and by the military services in measuring proficiency in the operation of a motor vehicle.

Standard flights (Exhibit 4) have been developed for various stages of the Civilian Pilot Training and War Training Service courses. Such standard flights have been used extensively in research conducted by the Committee on Selection and Training of Aircraft Pilots (88, 89, 95, 99). It is difficult to evaluate directly the influence which the concept of standard flights has had upon the operating program of the Civil Aeronautics Administration. However, the following facts may be of interest in this connection:

1. Standard flights have been prepared in descriptive and graphic form for nearly a score of airports at which CAA pilot training programs have been in operation. The use of standard flights was discussed with the personnel of the Civil Aeronautics Administration, General Inspection Division, as early as January, 1941 (82), and with personnel of the CAA Standardization Center at Houston, Texas, in 1942.
2. A manual, in the form of a bulletin, entitled *Standard Check Flight Procedures* (140), prepared in 1942, by the Committee on Selection and Training of Aircraft Pilots, was distributed by the CAA to flight supervisors throughout the country. It was also used in connection with the course in training methods given to personnel in the CAAWTS Secondary Instructor Course described on page 506.

So far as is known, the Committee research program was the first to develop and make field use of the standard flight as a fundamental technique in pilot evaluation. There is every reason to believe that the concept and techniques of standard flights as developed in Committee research have filtered into the research and operating activities of the military services in the United States. Particular interest in this development has been expressed by the research personnel of the Royal Air Force which has made considerable use of standard







ence to specific aspects of the performance. Beginning in 1939, research at Ohio State University was directed towards the development of a rating technique, including a standardized procedure for recording observations on specific items of pilot performance and an objective method of scoring such observations.

This research has led to the preparation of the Ohio State Flight Inventory, which is a comprehensive and standardized check list of items descriptive of a pilot's performance during flight. Check sheets are available for each maneuver

## S T E E P   T U R N S

	LEFT			RIGHT		
	Entry	Turn	Recovery	Entry	Turn	Recovery
<u>CONTROL USE</u>						
Simultaneous.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Successive.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slips.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skids.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neither.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rudder Pressure:						
Correct.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incorrect.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>PRECISION</u>						
Bank.....	Constant	<input type="checkbox"/>			<input type="checkbox"/>	
	Varies	— °			— °	
Speed.....		— MPH			— MPH	
Speed is:	Constant	<input type="checkbox"/>			<input type="checkbox"/>	
	Varies	— MPH			— MPH	
Altitude is:	Constant	<input type="checkbox"/>			<input type="checkbox"/>	
	Varies	— ft.			— ft.	
Recovers:	On heading	<input type="checkbox"/>			<input type="checkbox"/>	
	Off heading	— °			— °	

EXHIBIT 5. SAMPLE PAGE FROM "OHIO STATE FLIGHT INVENTORY"

taught in the CAA elementary course. Items are grouped, whenever possible, according to the portion of the maneuver being observed, as for example, entry, turn proper, and recovery in turns. When used in conjunction with standard flights, the Inventory provides for standardized observation and recording of the details of pilot performance during each maneuver. In addition, methods have been devised to yield maneuver scores and flight scores.

The Ohio State Flight Inventory has undergone several revisions based upon research and on field use of the instrument (9). For the form currently in use



(Exhibit 5) there has been provided a detailed manual giving specific instructions for its use (97).

Student Pilot's Name \_\_\_\_\_  
A SCALE FOR RATING PILOT COMPETENCY

No opportunity to observe

1. Considering his training, how skillful is he in carrying out precision maneuvers (spot landings, figure eights, etc.)?  
 very skillful | high average | average | low average | very poor
2. How does he handle the controls?  
 greatly over or under controls | considerably over or under controls | some over or under control | handles controls fairly smoothly | very smoothly and correctly
3. How carefully does he check his plane and engine before taking off?  
 very carefully | carefully | reasonably carefully | not carefully enough | does not check it
4. As compared with the other students you have trained, how readily does he "catch on" to your instructions?  
 very fast learner | fast | average | slow | very slow
5. To what extent does he have the feel of a ship?  
 unusually well | well | fairly well | poorly | not at all - flies mechanically
6. Does he show respect for a ship and its motor?  
 takes excellent care | takes good care | shows reasonable respect for both | tends to be careless | no regard at all
7. How tense or relaxed is he when flying?  
 extremely tense | rather tense | slightly too tense | almost sufficiently relaxed | ideally relaxed
8. Is he inclined to show off while flying a plane?  
 almost always | frequently | sometimes | seldom | never
9. How easily does he become upset when something goes wrong, for example, a motor failure?  
 very easily upset | easily upset | sometimes upset | usually calm and controlled | always calm and controlled
10. How confident is he of his flying ability?  
 much too confident | slightly over confident | sensibly confident | not confident enough | entirely lacking in confidence
11. Does he like to try out new things, new maneuvers and cross country trips, for example?  
 always tries new things | frequently trying new things | sometimes tries new things | rarely tries new things | never tries new things
12. How good is his judgment with regard to taking flying risks? (weather, stunting, etc.)  
 extremely cautious takes no unnecessary risks | rarely uses poor judgment | takes some unnecessary risks | takes many unnecessary risks | extremely reckless
13. How well is he satisfied with his flying ability?  
 always tries to improve | considerable effort at improvement | some effort at improvement | fairly well satisfied | entirely satisfied
14. In your opinion, considering skill, emotional stability, judgment, etc., how good an "all-around pilot" is he likely to become?  
 top notch private pilot | better than average private pilot | average private pilot | poorer than average private pilot | very poor - will not fly long

Rated by \_\_\_\_\_ Instructor

EXHIBIT 6. PURDUE RATING SCALE

The Ohio State Flight Inventory has served as a valuable source of criterion data in Committee research, such as in the 1942 Midwest Project (94) and in more recent studies at the Institute of Aviation Psychology, University of



Tennessee (32, 100). It has become familiar to many CAA flight instructors and inspectors both through its use in field research and through the course on training methods given at the institutes held at the University of Minnesota and at Ohio State University, in 1943, referred to on page 506. Copies of the current version have been supplied to the CAA Division of Research for use in research at Stephens College, Columbia, Missouri.

In general, the principle of standardized observation and recording of specific items of flight performance has found wide application in pilot evaluation. Copies of Ohio State Flight Inventory sheets and manual were requested in 1943 by the Army Air Forces for try-out on an experimental basis. CAA Form ACA-342Z, issued by the Civil Aeronautics Administration in 1943, embodies principles for observing and recording flight performance earlier used in the Ohio State Flight Inventory.

*Purdue Scale for Rating Pilot Competency.* This scale (Exhibit 6) was developed at Purdue University (1940) on the basis of preliminary research during which several other scales were constructed and the best points of each combined into a 14-item scale for experimental study. A factor analysis (40) showed that the items in the scale were, in general, measuring three factors, tentatively identified as "skill," "judgment," and "emotional stability." Experiment also indicated that ratings on this scale differentiated between criterion groups represented by the "best" and the "poorest" students of each of 91 instructors in a large number of flight training centers.

The rating scale has an important advantage in terms of ease of administration. It has been employed as a criterion measure in the Midwest Project (1942) and in connection with other research sponsored by the Committee on Selection and Training of Aircraft Pilots. The scale has been adapted for use in Navy pilot training and by the Northeast Airlines.

*Objective Recording of Pilot Performance.* An important outcome of Committee research on criteria has been the development of apparatus and techniques for recording in objective and permanent form the actual performance of the pilot and of the plane during flight. Two recording methods, *graphic* and *photographic*, have been investigated.

Research on the *graphic* method involved, first of all, the evaluation at Tulane University (1939-40) and at the University of Pennsylvania (1940-41) of commercial recorders, including the Friez Flight Record Analyzer and the Redhed Ride Recorder. Experimental trial of these instruments at Tulane University (83), at the University of Maryland (2), and at Harvard University (58, 59) early revealed basic limitations in these instruments. A detailed quantitative and qualitative analysis (83, 84) of graphic records, in research conducted at the University of Pennsylvania, has led to important conclusions concerning the possible use of such instruments in field work and in quantitative research. On the basis of these studies the Committee drew up specifications for a recorder particularly suitable for field use. A model of this instrument, known as the CAA-NRC Flight Recorder (61) was constructed at the Massachusetts Institute of Technology (1942-43). Further investigation with this apparatus is necessary in order to provide information as to its practical value and techniques for the analysis of the records. Although loaned to the U. S. Navy for field trial, little has been done with the recorder since its construction in 1943.

Research on *photographic* techniques has resulted in the development of installations useful in recording flight and control movement data descriptive of pilot performance. Problems of photographic recording were attacked inde-



pendently at the University of Rochester (1939-40) and at the University of Pennsylvania (1939-44). While the Rochester project, with the cooperation of the Director of Research, CAA, proceeded immediately to the development of a concealed photographic unit, including an instrument panel and control movement indicator (64), the Pennsylvania group, in its earlier studies, photographed directly the plane instrument panel and the actual manipulation of controls by the pilot (88).

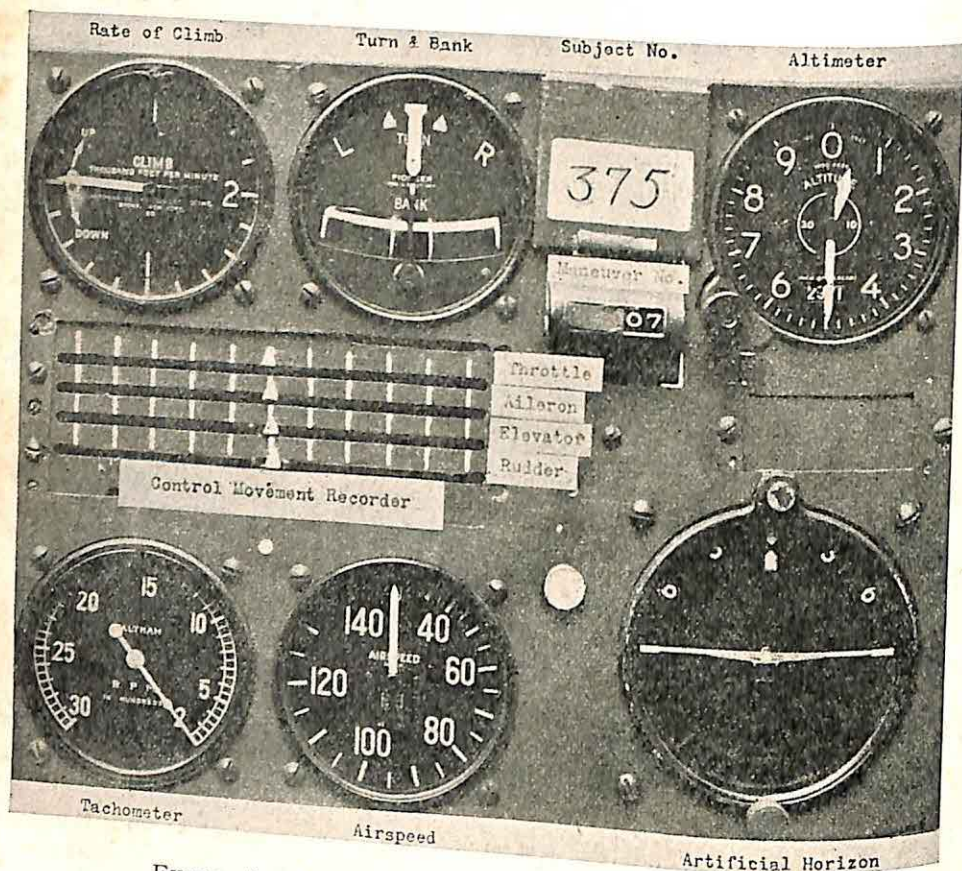


EXHIBIT 7. CAMERA FIELD—PHOTOGRAPHIC INSTALLATION

Present installations, adapted with the aid of the staff of the Institute of Aviation Psychology, University of Tennessee, provide for photography of an instrument panel and of a control movement recorder, developed at the University of Pennsylvania, located in the baggage compartment of the plane (Exhibit 7). Both the photographic installation and methods of analyzing photographic records developed in research at the University of Pennsylvania have been used in obtaining objective criterion data in the 1942 Midwest Project (89), the 1943 Midwest-Navy Project, and in studies currently conducted at the Institute of Aviation Psychology, University of Tennessee. There has been a considerable exchange of information on photographic methods with the Empire Central Flying School, both through the RAF Delegation and through representatives from training activities in Great Britain.

Graphic and photographic records and associated methods of analysis do



not yield direct measures of certain aspects of pilot performance, such as observance of safety precautions, use of certain types of judgment, etc. They yield measures primarily of value in analyzing the *skill* displayed in the execution of maneuvers and are particularly useful in research where detailed and objective information on the level of skill exhibited by the pilot is desired. Because of their objectivity, graphic and photographic records provide basic data for determining the reliability of a single test flight, and in selecting, for pilot assessment, those aspects of flight performance which are relatively stable from flight to flight. It is also possible that graphic and photographic methods could be used for diagnosing specific faults of students who have difficulty in learning to fly, in much the same way as motion photographs are currently employed in the analysis of the faults made by members of football teams during actual play.

### *Investigations of Commonly Used Techniques for Pilot Evaluation*

In addition to developing and evaluating new instruments and techniques, the Committee has conducted research on the evaluation and improvement of procedures commonly used in CAA pilot training programs for the assessment of pilot performance. Following is a discussion of Committee activities in this area.

*Analysis of CAA Rating and Grading Methods.* In 1939, when the Committee research program was initiated, two methods were used for the evaluation of pilot performance in the CAA Civilian Pilot Training program. One, designed for use by flight instructors, called for log book ratings on a 5-point scale on each maneuver practiced during instruction flights. The other, used by CAA flight inspectors at the time of the final flight test for licensing purposes, called for grades on a per cent basis.

A study at Tulane University (1939), involving an analysis of the records of student pilots trained at 12 CPT centers (35), showed low correlations between instructors' ratings and grades given by flight inspectors, and other serious limitations in the evaluation procedures. Lack of agreement between instructors' ratings and flight inspectors' grades was also reported in a study (43) at Purdue University (1939). Studies at Ohio State University (1939-41) revealed marked disagreements between pairs of instructors and between pairs of inspectors in rating pilots (9, 13). On the whole, research investigations showed that the systems of grading used in the field did not yield adequate criterion data for research purposes or for the accurate field assessment of pilot performance.

Almost every study on the prediction of student pilot success has made use of the "pass-fail" criterion. Although of value in the early stages of Committee research, the "pass-fail" criterion became less and less useful as the incidence of failure was reduced. There has therefore been increasing dependence, in research, upon the more sensitive and more objective methods for assessing pilot proficiency developed in Committee investigations described above.

In general, Committee research has been of extreme importance in pointing to the need for revising and improving methods for evaluating pilot proficiency traditionally employed in civilian pilot training programs. In this connection, there has been direct cooperation with the Division of Safety Regulation, CAA, in analyzing the forms and techniques employed by flight inspectors in arriving at flight grades as a basis for the certification of the private pilot. Such studies (1943-44) have involved the evaluation of Form ACA 342Z (13),



a CAA inventory of pilot performance, including the preparation of a detailed manual for the field use of this form (86). Results of investigations which are currently undergoing analysis will yield information on such basic questions as: (a) extent of agreement between inspectors in grading the same student on successive flight tests; (b) extent and nature of inspector differences in emphasizing specific student errors; (c) the reliability of the grade given by the inspector on the basis of a single flight test; (d) the accuracy of inspectors' observations of flight performance during flight tests as recorded in writing on Form ACA 342Z, and verbally, by means of the Air-borne Model Magnetic Wire Recorder (31). It is anticipated that the analysis of inspectors' observations and grades, in comparison with photographic recordings made in the Midwest-Navy study, will point the way towards practical methods of improving techniques employed by inspectors in the assessment of pilot proficiency as a basis for pilot certification.

Additional work on the improvement of instructors' ratings and inspectors' grades has been carried on at the Institute of Aviation Psychology, University of Tennessee, with particular emphasis on methods of grading useful in revealing stages of progress in learning to fly. If current field try-out of this technique yields results comparable to those obtained in preliminary studies, the findings can be of considerable value in improving the practices of instructors and inspectors in the evaluation of flight performance. This is an area which calls for close integration of the Committee research program with the operational activities of the Civil Aeronautics Administration.

*Relation of Maneuver Ratings to Total Flight Performance.* One of the by-products of the RAF study referred to on page 498 was the development of a criterion measure based on the ratio of successful to unsuccessful flights during flight training, which may well deserve serious consideration in the development of practical field criteria for CAA use (3). Also of possible value in planning for the improvement of flight assessment are data on the relationship between ratings on specific maneuvers and success or failure in flight training gathered in the same investigation (87).

*Analysis of Training Time as a Criterion.* A practical question for both civilian and military training is the extent to which student performance in the early stages of training is associated with or predictive of final performance. There is evidence from research (1941-42) conducted at the University of Rochester (103), the University of North Carolina (126, 128), and the Midwest Project (1942) that there is no close or consistent relationship between the number of hours spent in early stages of flight training and later success or failure in the course (70, 89). These findings, if confirmed in other studies, can be of particular importance in the training of civilian pilots where it may be unnecessary or even inadvisable to place marked emphasis on time to solo in evaluating pilot performance as a preliminary to wash out. Consideration of such findings might well lead to a revision of the civilian pilot training curriculum involving the removal of time limits for various stages of the training course.

*In the investigation of criteria, as in other areas, there are studies which have failed to yield practical outcomes or promising results for reasons enumerated in the Introduction to this report.* So, for example, early studies at Pensacola (1940-41), designed to devise a flight score based on the number of possible check flights and re-checks (57), failed to produce results useful to Committee research or to the CAA operating program. Preliminary experiments with a pilot-response recorder (37), developed at Indiana University in 1940, have not led to further use of this instrument either in the research program of the Committee



or in connection with the pilot training and assessment program of the CAA and military services.

Many critical problems with respect to criteria are not yet fully solved, such as (a) the establishment of cut-off points (for example, for washing out student pilots) on the Purdue Scale for Rating Pilot Competency or the Ohio State Flight Inventory, (b) the *grading* of graphic or photographic records on a scale of excellence of performance, (c) the determination of the relative value of various criterion measures and a means of combining them into an optimum criterion battery, and (d) the measurement of the "judgment" and "emotional stability" aspects of over-all pilot performance. Nevertheless, the over-all picture, as in the case of research on selection and training, is one of significant and practical achievement.

### EMOTIONAL DISTURBANCES ASSOCIATED WITH LEARNING TO FLY

Several studies, conducted chiefly in the earlier years of research, have been concerned with emotional and physiological reactions associated with flight. While several of these studies yielded results of theoretical interest, this group as a whole has perhaps produced the smallest returns in the way of practical findings directly applicable to flight. However, such studies were of value in indicating the areas of research upon which emphasis could be most profitably placed in the over-all program of the Committee on Selection and Training of Aircraft Pilots.

*Sleep Motility.* A study at the University of Virginia (1939-40), concerned with sleep motility of student pilots undergoing flight training (29), directed attention to motility during sleep following flight lessons. Correlations with success in flight training were not obtained and the study had no direct useful outcomes.

*Salivary Secretions and Respiratory Changes.* Laboratory tests on salivary secretion of students receiving flight training were made at Cornell University (1940), where investigators also obtained records of respiration and pulse rate during actual flight lessons (68). Limitations in experimental design and in the presentation and discussion of results make this study of questionable practical value.

*Muscle Potentials.* At the New York Psychiatric Institute (1940-41) a Myo-Voltmeter was designed to measure the electrical output of muscles during flight. Records from this instrument are visually apparent to both instructor and student during flight and the proposal was made that the instructor call the attention of the student to the level of tension associated with the performance of particular maneuvers. The apparatus also served to provide a cardio-tachometer record.

The use of the instrument is limited to the extent that absolute measurements cannot be obtained for comparing individuals. Exploratory studies were reported (47, 48), but no evidence is available on the trial of the instrument in connection with flight training, although provisions were included for its use in the University of Maryland study of "tension."

*Tension.* No final report providing statistical data and conclusions has been submitted on extended studies of "tension" during flight training conducted at the University of Maryland (1939-43).<sup>\*</sup> In preliminary and informal reports (53), attention has been called to the difficulties and ambiguity in applying the term "tension" to the flight situation. Instruments for measuring

<sup>\*</sup> A final report has since been received.



and recording muscle tension and associated physiological functions are available from these studies.

*Skin Temperature and Perspiration.* At Yale University (1940) an improved instrument was developed for measuring skin temperature and sweating in airplane pilots (62). This instrument, small enough to be attached to the palm of the pilot's hand, is known as the CAA-NRC Micro-Recorder. Preliminary tests showed appreciable changes in temperature and in humidity associated with flight experience. Efforts to obtain adequate ratings by instructors on tension and emotional stress during flight were unsuccessful. Twenty-five units of the instrument are available for further studies of response during flight.

*Muscular Set.* At New York University (1939-43) an elaborate polygraph was constructed for experimental work in the measurement of "muscular set." Findings are available on subjects examined in a laboratory situation (27), but no use has been made of the instrument in studies of pilot reaction and performance. The instrument was recently loaned to the National Defense Research Committee for special investigations being conducted by one division of this war research agency.

*Noise and Vibration.* Studies at the State University of Iowa (1940-43) indicated that noise and vibration conditions, similar to those encountered in military aircraft during flight, showed no significant effect upon performance on the Mashburn Serial Action Test, even when continued for four and one-half hours (50). No measures were obtained of increased physiological cost. The study led to no specific proposals for action.

### STUDIES OF AIRSICKNESS

Considerable work in the study of airsickness has been carried on at Wesleyan University (1939-43) and at the University of California (1940-43). These were largely exploratory studies designed to test hypotheses concerning psychological and physiological determinants of airsickness (6, 122, 123).

One practical outcome of this work is a popular pamphlet, entitled *How to Prevent Airsickness*, which has been widely distributed by the Civil Aeronautics Administration (81). Studies of airsickness have also yielded a number of research tools, particularly a motion sickness questionnaire which has been adapted for use in an extension of studies of motion sickness under the auspices of the Committee on Aviation Medicine, Committee of Medical Research, Office of Scientific Research and Development. In addition, the studies have contributed to the effectiveness of the work of other organizations, such as the Canadian Associate Committee on Seasickness, particularly in avoiding wasted effort in the exploitation of unprofitable leads in research.

More recently (1943-44), use has been made of the Stability of Orientation Test, developed at Brooklyn College (132), in the further examination of determinants of visually-induced airsickness as a supplementary feature of research being conducted at that institution.

### AVIATION ACCIDENTS

In a current study (1943-44) the causes of civil aviation accidents, and the maneuvers most closely related to these accidents (Exhibit 8), are being investigated. The frequency with which fatal accidents are associated with stalls, particularly those growing out of turns at low altitudes, has suggested the necessity of important basic changes in the training program. A practical outcome of such research findings and conclusions would be a shift in emphasis during training from precision entries and execution of stalls and spins to



training in the avoidance of and immediate recovery from the stall condition, possibly through extended practice in slow flying.

### GENERAL OUTCOMES

In addition to the specific outcomes summarized on the preceding pages, there have been important by-products from the operation of the Committee on Selection and Training of Aircraft Pilots.

Committee meetings have served as a forum for the exchange of ideas among civilian and military agencies and personnel concerned with the problems of aviation psychology. This was particularly true in the early years, since the Committee on Selection and Training of Aircraft Pilots was functioning actively before the military services had established units for psychological

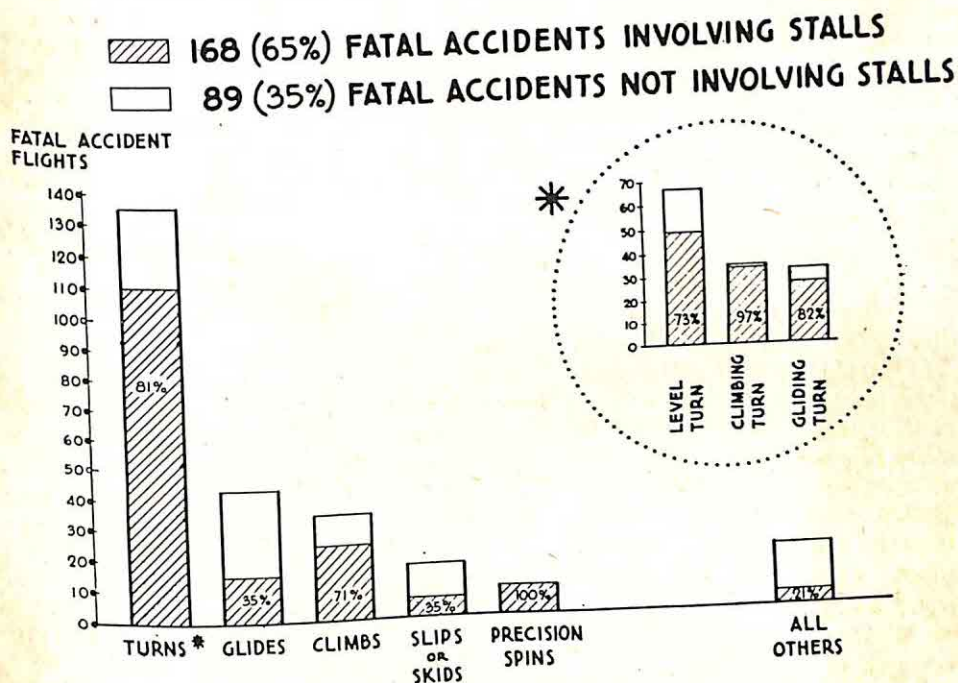


EXHIBIT 8. LEAD MANEUVERS IN 257 FATAL ACCIDENTS WITH NO STRUCTURAL DEFECT

research in aviation. The Committee continues to serve as a medium for the exchange of experience, for formulating objectives, and for facilitating the application of such research. Committee membership and liaison include representatives from the military services of the United States and foreign countries, as well as from the civilian agencies concerned with problems of aviation personnel. This fact has contributed considerably to the effectiveness of the Committee in these respects.

Numerous universities and research centers throughout the country have been drawn into research in aviation psychology through participation in the work of the Committee on Selection and Training of Aircraft Pilots, including the universities and laboratories which have conducted basic research under grants from the Committee on Selection and Training of Aircraft Pilots, and approximately 550 additional centers involved in the administration of aviation selection tests through the Standard Testing Program and the CAA-National



Testing Service. Such activities have served to arouse interest in aviation psychology research and to establish a core around which an extensive and effective program of post-war research in aviation psychology can be developed.

In cooperation with the Civil Aeronautics Administration and the Tennessee Bureau of Aeronautics, the Committee on Selection and Training of Aircraft Pilots has established an Institute of Aviation Psychology at the University of Tennessee. The Committee program has led to the organization of a similar center at Ohio State University. In this way, the Committee on Selection and Training of Aircraft Pilots is striving to avoid the cessation of research in aviation psychology which occurred at the end of World War I.

Through the work of the Committee a considerable number of professional men and women have become actively engaged in research in aviation psychology. In an address made in 1943, Commander (then Lt. Cdr.) John G. Jenkins, Aviation Psychology Branch, Division of Aviation Medicine, Bureau of Medicine and Surgery, U. S. Navy, expressed gratitude to the Committee for turning over to that section approximately one-quarter of the section's personnel. In the Army Air Forces, as well as in the U. S. Navy, there are men engaged in research in aviation psychology who are applying training and experience acquired in programs supported by the Committee on Selection and Training of Aircraft Pilots. These, as well as those still engaged in work with the Committee at various universities, are in a position to utilize such training and experience in research in aviation psychology in the post-war world.

Publications of the Civil Aeronautics Administration have stressed its goal as that of insuring "air-worthy aircraft flown by competent pilots." In contrast to other groups, which have emphasized the development of airworthy aircraft, the National Research Council Committee on Selection and Training of Aircraft Pilots has centered attention on the human aspects of aviation with the view of achieving maximum competency, and the highest possible level of performance and safety on the part of the aircraft pilot. By doing so, the Committee has served to establish a firm foundation for a sound structure of research and practice in the attainment of the goal of the Civil Aeronautics Administration.

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## ABNORMAL AND CHILD PSYCHOLOGY

Chairman: JAMES O'GORMAN, Hunter College

*Social Contacts of Psychiatric Patients: A Preliminary Study.* ALBERT I. RABIN, New Hampshire State Hospital.

*Attitudes of Mental Patients towards Prolonged Hospitalization.* EUGENIA HANFMANN, Mount Holyoke College.

*A Comparative Study of Institutionally Adjusted and Maladjusted Defective Delinquents.* SAMUEL B. KUTASH, Harlem Valley State Hospital.

*Observations in a Group of Six- and Seven-Year-Old Children in Recreational Activities.* ALICE FRIEDMANN, Manhattanville Child Care Center.

*Adult Adjustment of Foster Children of Alcoholic and Psychotic Parentage and the Influence of the Foster Home.* ANNE ROE, Yale University.

*An Experimental Study of Ego-orientation in Work.* HELEN BLOCK LEWIS, New York City.

## CLINICAL AND MILITARY PSYCHOLOGY

Chairman: CARNEY LANDIS, New York Psychiatric Institute and Hospital, and Columbia University

*An Experimental Investigation of Materials for Teaching Reading to the Mentally Retarded Adult.* MAX COOPER, Institution for Male Defective Delinquents, Napanoch, N. Y. (Sponsored by Brian E. Tomlinson.)

*Maladjustment in Old Age.* GEORGE LAWTON, New York City.

*Clinical Use of the Mental Deterioration Index of the Bellevue-Wechsler Scale.* JOSEPH LEVI, SADI OPPENHEIM, DAVID WECHSLER, New York University and Bellevue Psychiatric Hospital.

*A General Questionnaire.* LIEUT. J. M. SACKS AND CPL. S. B. ZUCKERMAN, Army of the United States.

*The Cornell Service Index: A Method for Quickly Assaying Personality and Psychosomatic Disturbances in the Men in the Armed Forces.* ARTHUR WEIDER, KEEVE BRODMAN, BELA MITTELMANN AND HAROLD G. WOLFF, Cornell Medical College; David Wechsler, New York University and Bellevue Psychiatric Hospital.

*The Use of the Cornell Service Index—Form S—in the Evaluation of Psychiatric Problems in a Naval Hospital.* LIEUT. NATHANIEL WARNER (MC) USNR, AND LIEUT. (J.G.) MARGARET WILSON GALICO H(W), USNR. (Sponsored by Arthur Weider.)

*A Psychological Study of Sexual Promiscuity and Venereal Disease.* ROBERT WEITZ AND H. L. RACHLIN, Midwestern Medical Center, United States Public Health Service. (Sponsored by Brian E. Tomlinson.)

## COMPARATIVE AND PHYSIOLOGICAL

Chairman: FRANK A. BEACH, American Museum of Natural History

*The Influence of the Male Cichlid Fish, *Tilapia Macrocephala* on the Spawning Frequency of the Female.* LESTER R. ARONSON, American Museum of Natural History. (Sponsored by Frank A. Beach.)

*The Effect of Electroshock Convulsions on the Maze Habit in the White Rat.* CARL P. DUNCAN, Brown University. (Sponsored by Harold Schlosberg.)

*The Effects of Electroshock Convulsions on Double Alternation Lever-Pressing in the White Rat.* ELLIOT R. MCGINNIES, JR., Harvard University. (Sponsored by Harold Schlosberg.)



- Some Conditions of Hoarding in White Rats.* J. McV. HUNT, Brown University.  
*Postural Behavior of Infant Chimpanzees as Studied by the Gesell Developmental Schedule.* CAPT. AUSTIN H. RIESEN, Army of the United States, and ELAINE F. KINDER, Yerkes Laboratories of Primate Biology.  
*Speech Intelligibility Under Various Degrees of Anoxia.* G. M. SMITH, College of the City of New York, and LIEUT. (J.G.) C. P. SEITZ, USNR.

## LEARNING AND CONDITIONING

Chairman: HAROLD SCHLOSBERG, Brown University

- On the Roles of Activity and Participation in Learning and Reminiscences.* THELMA G. ALPER AND ERNEST A. HAGGARD, Harvard University.  
*Some Factors Involved in Conditioning the Autokinetic Effect.* E. A. HAGGARD AND R. BABIN, Harvard University.  
*Stimulus Equivalence in Chained Conditioning.* J. DONALD HARRIS, Medical Research Laboratory, Submarine Base, New London.  
*The Spread of the Influence of Rewards to Connections Remote in Sequence and Time: Comparison of Young and Old Adults.* IRVING LORGE, Columbia University.  
*Meaningful Similarity and Interference in Learning.* CHARLES E. OSGOOD, Yale University.  
*Genetic Changes in Semantic Conditioning.* BERNARD F. RIESS, Hunter College.  
*Conditioning and Extinction of Subordination in the Rat.* JOHN P. SEWARD, Connecticut College.

## GENERAL SESSION

Chairman: EDNA HEIDBREDER, Wellesley College

- Is the Psychopathological Interpretation of the German Enigma Necessary?* THEODORE ABEL, Columbia University.  
*The Response of Organisms to Stimulus Configurations and the Hypothesis of Afferent Neural Interaction.* CLARK L. HULL, Yale University.

## PRESIDENTIAL ADDRESS

- Problems in the Study of Leadership.* HENRY E. GARRETT, Columbia University.

## APPLIED AND GENERAL PSYCHOLOGY

Chairman: ALBERT D. FREIBERG, Psychological Corporation

- Color Aptitude Test.* FORREST LEE DIMMICK, Hobart College.  
*Tonal Range Preferences of Broadcast Listeners.* PHILIP EISENBERG AND HOWARD A. CHINN, New York City.  
*Some Factors Affecting the Comparison of Short Temporal Intervals.* B. R. PHILIP, Fordham University.  
*On the Method of Psychology.* MORITZ LÖWI,\* Connecticut College.

## PERSONALITY

Chairman: GARDNER MURPHY, College of the City of New York

- Psychoanalysis and a Dynamic Use of the Questionnaire Method.* ELIZABETH F. HELLERSBERG, Good Habits Committee of the National Research Council.

\* Paper was read by Mrs. Löwi, due to the death of Dr. Löwi.



- The Formula of Configuration in Graphic Expression: An Experiment in Personality and Aesthetics.* WERNER WOLFF, Bard College.
- Advances in the Technique of the Thematic Apperception Test.* FREDERICK WYATT, McLean Hospital and Massachusetts General Hospital.
- The Discovery of Functional Unities in Personality Traits.* RAYMOND B. CATTELL, Duke University.

## SOCIAL PSYCHOLOGY

Chairman: SOLOMON ASCH, New School for Social Research

- Public Opinion Toward Conscientious Objectors: Progress Report.* LEO P. CRESPI, Princeton University.
- A Case Study in the Perpetuation of Error.* GEORGE W. HARTMANN, Columbia University.
- Cultural Conflict and the Feminine Role: An Experimental Study.* GEORGENE H. SEWARD, Connecticut College.
- A Study of Personality and Attitude Measurements of Students who Belong to the Inter-Collegiate Gospel Fellowship.* LUTHER CRAIG LONG, Psychologist for the War Department, Grand Central Palace Induction Station. (Sponsored by Brian E. Tomlinson.)
- A Preliminary Study of the Factors in the Identification of One's Own Handwriting.* M. E. TRESSELT, Hunter College.

## FILMS

Chairman: BERNARD F. RIESS, Hunter College

- Condition, Extinction and Disuse in the Fighting Behavior of the Rat.* JOHN P. SEWARD, Connecticut College.
- The Expression of Personality (with verbal comments).* WERNER WOLFF, Bard College.

## ROUND TABLES

- New Developments in Public Opinion Research.* PAUL F. LAZARSFELD, Chairman. Participants: BERNARD BERELSON, HERTA HERZOG, BEN GEDALECIA.
- The Role of Rorschach Method in Planning for Treatment and Education.* BRUNO KLOPPER, Chairman. Participants: FRITZ SCHMIDL, WILLIAM GOLDFARB, MORRIS KRUGMAN, MARGUERITE HERTZ.
- Veterans Rehabilitation: The Need for Qualified Personnel.* JOHN G. PEATMAN, Chairman. Participants: CARL ROGERS, MEYER H. SARKIN, ROBERT H. MATHEWSON. Discussants: ROBERT A. BROTEMARKLE, DONALD G. MARQUIS, BRUCE V. MOORE, PERCIVAL M. SYMONDS.

## APPENDIX TO PROCEEDINGS

### EASTERN PSYCHOLOGICAL ASSOCIATION

#### RESULTS OF POLL ON RESOLUTION RE EDITORIAL IN JOURNAL OF CLINICAL PSYCHOLOGY

The Special Committee\* appointed to draft a resolution disapproving an editorial paragraph in the *Journal of Clinical Psychology* (Vol. I, No. 1) which

\* See p. 528.



implied support for a quota system in the field of clinical psychology, submitted the resolution in a mail referendum to the 800 members of the Association, together with opportunities to vote on the desirability of offering the resolution to certain professional journals and to the public press for publication and whether or not the members favored a standing committee to examine public statements by psychologists bearing on the issue of racial and religious prejudice.

A statement of the questions asked and the results obtained follows:

1. I vote in favor of the following resolution.

The Eastern Psychological Association is convinced that in all branches of psychological work the highest standards of intellectual and personal fitness should prevail. The requirement is probably more exacting in the field of psychology than in most other departments of science, since research with, and direct service to, human beings demand intellectual competence, personal integrity, and a sensitive and well-balanced personality. Particularly to the field of clinical psychology do these requirements apply.

In the process of selecting, training, and placing young psychologists in professional work considerations of race and creed are irrelevant. A "quota" system applied to graduate schools, for example, would not guarantee that the most capable individuals would be admitted to the profession. On the contrary, such a system would set up a wholly arbitrary criterion and would violate the principles of democracy which must be maintained if psychology in America is to prosper.

The proposal for a "quota" system debases a profession which prides itself upon its respect for the individual person and upon its ability to select and train individuals for scientific work and for public service purely on the basis of merit.

Whether applied openly or surreptitiously, quota systems are therefore repugnant to the members of the Eastern Psychological Association and are condemned. The Association consequently disapproves an editorial paragraph in the *Journal of Clinical Psychology*, Vol. I, No. 1, January 1945, which implies support for a quota system in clinical psychology.

YES 370 (92%) NO 32 (8%)

2. I vote that copies of this resolution be sent to the Editor of the *Psychological Bulletin* (for publication if he is willing); to Dr. Thorne, editor of the *Journal of Clinical Psychology* (for publication if he is willing); to the Committee on Professional Ethics of the American Psychological Association, with the suggestion that this committee may wish to consider whether action is desirable.

YES 366 (91%) NO 35 (9%)

3. Should this resolution be given to the public press?

YES 256 (65%) NO 136 (35%)

4. Do you wish to have the Eastern Psychological Association establish a standing committee to examine public statements by psychologists bearing on the issue of racial and religious prejudice?

YES 250 (63%) NO 145 (37%)

SPECIAL COMMITTEE  
E. G. BORING (ex officio)  
J. G. PEATMAN  
D. SHAKOW  
G. W. ALLPORT, *Chairman*



# PROCEEDINGS OF THE TWENTY-FIFTH ANNUAL MEETINGS OF THE WESTERN PSYCHOLOGICAL ASSOCIATION

RALPH H. GUNDLACH\*

*University of Washington*

For the third year the Association dispensed with a coast-wide meeting, and encouraged local meetings in Seattle, the Bay Area and Los Angeles.

The meeting in the Bay Area was held on Saturday, June 23, in Berkeley at the University of California. Dr. Jean Walker Macfarlane was local chairman. Approximately 80 persons attended the sessions. The meeting in the Northwest was held on Saturday, June 23 in Seattle at the University of Washington. Dr. E. A. Esper was local chairman. The meeting in Los Angeles was held July 28 at the University of Southern California. Dr. Floyd Ruch was local chairman.

The officers of the Association still remain: President, Jean Walker Macfarlane, Institute of Child Welfare, University of California; Vice President, William Griffith, Reed College; Secretary-Treasurer, for a three year term, Lester F. Beck, University of Oregon, at present on leave.

## PROGRAM OF THE BAY AREA MEETING SESSION I

Saturday June 23

E. C. TOLMAN, Chairman

*Differences Between Delinquent and Non-Delinquent Boys as Indicated by the Thematic Apperception Test.* HOWARD WELLS, University of California.

The purpose of the study is to see what significant differences, if any, appear in the Thematic Apperception Test responses of two groups of boys. The one group is known to be delinquent and is considered to be quite disturbed, the other group has been matched with the first for age, IQ, and socio-economic status, but is considered well adjusted. All boys are under sixteen, and five pair of cases are Negroes. The responses have been scored according to the method developed by Murray and Sanford. The thematic productions of the experimental and control groups will be compared quantitatively in terms of feeling tone, outcome, need and press. Consideration will also be given to certain qualitative factors. There will be discussion of selected cases in which the TAT results are related to other relevant information.

*Relaxation in Psychotherapy.* DOROTHY H. YATES, San Jose State College.

The principal purpose of this report is to compare and discuss two methods of relaxation, that of Edmund Jacobson and an association-set procedure. Relaxation of muscles is an effective way of eliminating emotion, hence important. Objections are raised to Jacobson's method because of its length, difficulty, generality, undesirable meticulousness, and neglect of psychological factors. The association-set technique is essentially conditioning, but explanation, motivation, self-direction, etc., are also components. A word connoting relaxation, such as *peace*, *quiet*, or *calm*, is selected by the client; physical relaxation and calming associations are linked with this word; and there is a set, or

\* Acting secretary-treasurer in the absence of L. F. Beck.



conviction, that at any future time recalling the key word will reinduce relaxation. While the technique is generally used in combination with other procedures, report is made on 24 cases in which association-set was used exclusively. The problems were single, uncomplicated ones, presented by persons who needed speedy help.

*Some Responses of the Psychopath Interpreted in the Light of Lindner's Suggested Application of the Concept of Homeostasis.* ROBERT B. VAN VORST, Preston School of Industry, Ione, California.

Lindner has recently suggested the application of the concept of homeostasis and the overflow procedure as the means of further interpreting and clarifying the behavior of the psychopath. The use of this concept gains support from findings that show overt behavioral criteria more clearly differentiate the psychopath from other delinquents than do his psychometric responses. In further support is the fact that the psychopath differentiates himself from delinquents with other mental disorders by the more predatory and violent nature of his anti-social acts.

*Preference for Sex Symbols and Their Personality Correlates.* KATE FRANCK, University of California.

In order to investigate the relationship between attitudes toward sex and personality structure, preference for male or female sex symbols was correlated with responses on a personality questionnaire. Pairs of pictures each showing one male and one female symbol were presented to 119 female undergraduates, who indicated their "aesthetic" preference in each pair. Scores were assigned to the female symbols. The group was divided into a low and a high half. Relationships between responses to each of the questionnaire items and both the score groups were tested by the Chi Square method. Sixteen questionnaire items proved significant on the 5% level or better. Considering all of these differences together, it was concluded that girls preferring male symbols were more mature, i.e., accepted their role as women and accepted men as their counterpart, while girls preferring female symbols were less mature.

*Measured Personality Characteristics of Convulsive Therapy Patients: A Study of Diagnostic and Prognostic Criteria.* R. E. HARRIS, Langley Porter Clinic.

Results of personality inventory (Minnesota Multipliasic) findings obtained before and after convulsive therapy are available for diagnostic groups (schizophrenia, manic-depressive, depressed, schizo-affective psychosis, involutional melancholia and severe psychoneuroses) and for prognostic groups (unimproved, improved, much improved, and recovered, following electric shock, insulin and electro-narcosis therapy). Patterns of the scores and their magnitudes differentiate both the diagnostic and prognostic groups. The diagnostic patterns follow in general the names of the scales as in the original standardization, with some more specific ratios increasing the agreement. Poor prognosis was found to be associated with a clinical diagnosis of schizophrenia or severe psychoneurosis and a pattern of high scores in the psychotic scales including psychasthenia.

*Social Perception of Traits from Photographs.* EGON BRUNSWIK, University of California.

Psychology classes totalling 95 subjects judged standardized photographs of 46 Army STP students (IQ approximately 90 to 140) unknown to them. Correlating "real" traits (mutual ASTP ratings, for intelligence also tests) with corresponding average intuitive estimates shows *social perceptual validity* ("achievement") to be negligible for intelligence (under .10), statistically significant for personality traits such as energy and likeability (about .35). Goodlookingness yields .65. *Halos* among judgments are strong,



and unrealistic considering low corresponding real-trait relationships (added in parenthesis): intelligence with energy, .84 (.28); with likeability, .62 (.01); with goodlookingness, .59 (.05). Among possible cues, height (stature) correlates .25 with intuited intelligence; if confirmed, this possibly indicates utilization of low but established height-IQ relationship of about .15 also found here. Among facial features, forehead-height shows only .18 (compare with popular prejudice!) versus .22, nose-height .20 versus .13.

## SESSION II

Saturday June 23

E. R. HILGARD, Chairman

*Certain Aspects of 551 Cases Brought Before the Separate Women's Court of San Francisco.* MARY C. VAN TUYL, Separate Women's Court, San Francisco.

Psychometric examinations are given to all women who are brought into the Detention Ward located in the Public Health Building. Results for the 551 women appearing before the Court in the 6 months between Feb. and Sept. of 1944 were tabulated against the following factors: Race, age, state of birth, limits of formal schooling, length of time in California, presence of venereal disease in infectious stage at time of arrest, and history of venereal disease infection. An attempt was also made to appraise degree and relation of the factors to alcoholism, drug addiction, promiscuity, and prostitution, and to tabulate these factors against mental level. Differences of distribution in mental level in the white and colored cases show plainly that the data from these two groups should be handled separately, i.e., whenever mental level is one of the pattern factors to be considered.

*Civilian Testing, California Quartermaster Depot.* PHYLLIS F. BARTELME, Chief, Employee's Testing Section.

Testing as an aid to personnel management; relationship of testing to staff and operating units; organization and operation of the Testing Section; scope of testing, approved testing and equipment; application and uses of testing.

*Do Scale Constructors Use the Method of Equal Appearing Intervals?* PAUL R. FARNSWORTH, Stanford University.

Studies of the frame of reference employed by subjects who are asked to prejudge attitudinal items by the Thurstone method show that approximately two-thirds of the members of one judging group did not regard each rating step as midway between the immediately contiguous steps. Each scale value was regarded rather as simply "more than" or "less than" its closest neighbor. When subjects were requested to check the attitudinal extremes on a militarism-pacifism line-continuum a sizable number felt that the neutral point should not fall at the center of the continuum. A few failed to accept a straight line as an adequate representation of the attitudinal continuum. The data of these experiments tend to invalidate the idea that in prejudging attitudinal items all or even most judges employ as their judgmental frame of reference the method of equal appearing intervals.

*Permissible Coarseness of Grouping.* RHEEM F. JARRETT, University of California.

Statistics computed from grouped data are obviously more unreliable than those computed from ungrouped data, because errors of grouping are superimposed upon the errors of random sampling. Thus no universal answer may be given to the question as to the number or size of class intervals which should be employed in reducing a set of data. The answer will depend upon the extent to which the unreliability of the statistics is to be



permitted to be increased over the irreducible minimum of sampling unreliability. The work of Fisher on the standard error of grouping and that of Tippett and others on the sampling distribution of the range provide information necessary to the computation of tables from which may be determined the size of interval to be employed if confidence is to be entertained that grouping errors shall not increase the standard error of mean or of standard deviation by more than some specified proportion of the standard error of random sampling. Justification is found in these tables for some of the rule-of-thumb procedures commonly employed by psychologists for sample sizes usually found in psychological studies.

*Some Neglected Aspects of Test Efficiency.* FRANKLIN M. HENRY, University of California.

The inadequacy of the validity coefficient  $r$  has been recognized by Taylor and Russell, whose *selection ratio* tables show that in some circumstances a validity coefficient of .50 may be more useful than one of unity. The reason for this emerges upon analyzing the scatter diagram. With a low incidence of criterion success the proportion of success in the selected group changes slowly until after the percent retained has approached the percent of unselected success. But if unselected criterion success is high, small amounts of selection result in relatively large improvements and the rate of improvement decreases with further selection. In counseling and guidance, the composition of the discarded group is of particular interest. Here, the proportion correctly placed by the test is high if unselected criterion success is low, but if it is high the proportion correctly placed is small and rapidly decreases as the percent discarded increases. In the latter case, validity must be quite high for a test to be useful.

*Seasonal Variations in Growth.* HAROLD E. JONES, University of California.

A public school sample, consisting of approximately 90 boys and 90 girls, was examined semi-annually over a period of seven years with a battery of tests of static dynamometric strength (right grip, left grip, pull, and thrust). The average age range was from 11 to 18 years. The puberal growth spurt for each individual was plotted with reference to seasonal incidence; maximum growth in strength was found to occur about twice as often in the spring as in the fall months. When average increments were referred to the months of the year, it was found that among girls about three-quarters of the total annual growth in strength occurred in the months of March, April, and May, with most of the remaining growth falling in the summer months. Among boys, differences were smaller in amount, but growth increments for April were significantly greater than for October. These results are in accord with other studies showing a greater velocity of growth in the spring, in height and in skeletal maturing.

## PROGRAM OF THE SEATTLE MEETING

Saturday Morning, June 23

### ROUND TABLE ON PSYCHOLOGICAL PROCEDURES IN PERSONNEL WORK

E. R. GUTHRIE. *Faculty Jury Rating Methods in the Determination of Teaching Effectiveness.*

LT. THEODORE BARNOWE. *Relation of Trade Tests to Morale Building.*

Saturday Afternoon, June 23

### SYMPOSIUM IN CLINICAL PSYCHOLOGY

MIRIAM MURRAY, Chairman

LOREN BUNDAS, Catholic Children's Bureau. *The Projective Techniques—Their Values, Limitations, and Clinical Application.*



HAROLD M. HILDRETH, Naval Hospital. *Clinical Psychology in the United States Navy.*

RAMONA MESSERSCHMIDT, State Department of Social Security. *Contributions of the Psychologist to the Field of Social Work.*

VIRGINIA BLOCK, Child Guidance Department, Seattle Public Schools. *The Psychologist in the Public Schools.*

## PROGRAM OF THE LOS ANGELES MEETING

Saturday Morning, July 28

### CLINICAL PSYCHOLOGY

GILBERT BRIGHOUSE, Chairman

*Visual and Auditory Perceptual Factors in a Group of Gifted Children.* SARA STINCHFIELD HAWK, Scripps College.

Three groups of children were chosen from the Polytechnic Elementary and Junior High School in Pasadena ranging from the 2nd through 8th grade, for comparison along the lines of sensory and motor adaptation in the school situation. Group I represents all of the children referred this year from the grades mentioned for Remedial Reading; Group II is a control group of children equated for age, grade and intelligence, but with no reading difficulty; and Group III is another group from the same age, grade and approximate environmental set-up, but superior in oral reading and auditory perception, with no reading difficulty and in the highest IQ section of the class.

*Conclusions:* Most of the children in the remedial reading group were better on the visual than on the auditory perception side; some were best in auditory or motor. Control cases exceeded the remedial group not so much in a quantitative way as on qualitative performance. The third group, consisting of well-adjusted children with superior oral speech and auditory understanding were superior in varying degrees, in visual and auditory perception, and in verbalization.

*The Use of the Rorschach Test Under Sodium Amytal and Under Hypnosis in Military Psychiatry.* WALTER L. WILKINS, Lt. Comdr. H(S) USNR, and AUSTIN J. ADAMS, Lt. MC, USNR.

Certain types of cases for which the Rorschach technique provides a paucity of responses and for which the sodium amytal or hypnotic techniques reveal significant personal background materials show somewhat different Rorschach patterns when the test is administered under these conditions. Illustrative protocols are presented and comments on the technique are offered.

*Standardizing the Interpretation of the Rorschach Responses.* CHARLOTTE BUEHLER, Los Angeles County Hospital.

No abstract available.

*Description of a Project in Group Therapy.* DOROTHY W. BARUCH.

Group therapy was undertaken with a mixed group of 23 adults. The subjects were students enrolled in a course in "Techniques of Therapy." On the assumption that the students spontaneously elected to have such an experience. Twelve therapeutic group discussion sessions were held; one session in therapeutic writing and one in psychodrama. Observational notes were taken during the therapeutic group discussion sessions. Leadership techniques were then arrived at by the group, analyzed and summarized. Informal statements of growth were turned in. The present paper briefly describes the project,



gives illustrative excerpts from the observational records, summarizes leadership techniques and growth indicated.

*Symposium on the Work of the Psychological Services Branch of the Convalescent Services Division of the AAF Redistribution Station Number 4.* (1 hour)  
LEE EDWARD TRAVIS, MAJOR AC AND GROUP.

The Psychological Services Branch consists of four sections: Orientation, Program Placement and Evaluation, Counseling, and Administration and Research. An officer is in charge of each section. Major Travis gave an over-all picture of the mission of the Psychological Services Branch outlining the general function of psychology in the Convalescent Services Division. This general discussion included procedures, policies, principles, and practices; the type of patient encountered, his present problems, his future army and post-war assignments. Each officer in charge of his section discussed briefly the functions and activities of his section showing how his work is related to that of the Branch as a whole and to the Convalescent Services Division program.

Afternoon Session, July 28

# PENCIL AND PAPER MEASURES OF TEMPERAMENT AND PERSONALITY

ROY DORCUS, Chairman

*Recent Evidences of Validity of the Humm-Wadsworth Temperament Scale.*  
DONCASTER G. HUMM.

No abstract available.

*A Brief Statement Concerning the Effectiveness of the Humm-Wadsworth Temperament Scale.* JAMES L. FULTON, Lt. Los Angeles Police Department.

Six hundred and six members of the Los Angeles Police Department were tested by means of the Humm-Wadsworth Temperament Scale. Of these, 115 were regular employees, 48 had earned promotion to staff positions, and 506 were war emergency appointments. (348 are still employed, 55 resigned voluntarily, and 103 were discharged.) All of these were rated as follows: Very Good, Good, Doubtful, Poor, or Very Poor.

Humm-Wadsworth Rating	War Emergency Policemen			Reg. Police	Staff Members
	Still Empl.	Resigned	Discharged		
Fair or better	14%	26%	1%	38%	61%
Doubtful or worse	86%	74%	99%	62%	39%

These findings show an agreement between the quality of the employees and the findings of the Humm-Wadsworth Temperament Scale. Inasmuch as temperament is behavior tendency and not behavior, the most significant finding is that with discharged policemen, since behavior tendency is here identified with resultant behavior.

*Ability of Adults to Fake Desirable Responses on Two Personality Self-Inventories and an Attempt to Develop a "Lie Detector" Key.* FLOYD RUCH, University of Southern California.

Pencil and paper self-inventories are easily influenced by the average adult. To overcome this limitation a "Lie-detector" key was developed. It was assumed that the person who tries to influence his score will succeed better on the easy-to-influence than on the hard-to-influence items. Therefore Total Adjustment Scores on the California Test of Personality Adult Form A were corrected by multiplying them by the ratio



of the correct answers earned on the hard-to-influence items over the number of correct answers on the easy-to-influence items. The validity of the correction method was tested by administering the test to a group of 155 persons under the clinical and the employment conditions. Each blank was scored to yield an uncorrected score, a correction factor, and a corrected score. The mean of the uncorrected scores for the clinical condition equalled 132 (55th percentile rank); whereas the mean of the employment scores equalled 160 (94th percentile rank). When the correction factor was applied the means became 164 and 166 respectively.

*Insight of College Students into the Items of a Personality Test.* MORRIS KIMBER, University of Southern California.

*Problem:* The present investigation was carried out to discover the extent of college students' insight into the items on a test of personality to discover possible relationships between this insight and other identifiable traits or characteristics of personality.

*Procedure:* The California Test of Personality was twice administered to approximately 400 students registered in a beginning course in psychology at the University of Southern California. On the first occasion students were instructed to answer the questions as they believed that a happy and well-adjusted student at Southern California would answer them. On the second occasion students answered for themselves. The Army Alpha Examination, a test of intelligence, was later administered to the group.

*Conclusions:* Students differ greatly in the amount of insight which they possess. Most students secured high scores on the first test and low scores on the second. A high degree of insight is regarded as responsible for this difference.

#### PANEL DISCUSSION

Discussion of the above papers and topics by: GLEN GRIMSLEY, Supervisor of Testing, Lockheed Aircraft Corp.; LEBARON STOCKFORD, Industrial Relations Analyst, Lockheed Aircraft Corp.; BEN S. TRYNNIN, Director of Industrial Relations Research, Merchants and Manufacturers Association of Southern California.



# PSYCHOLOGY AND THE WAR

Edited by  
DONALD G. MARQUIS

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## PRESENT ORGANIZATION, POLICIES, AND RESEARCH ACTIVITIES OF THE AAF AVIATION PSYCHOLOGY PROGRAM

### STAFF, PSYCHOLOGICAL BRANCH

*Office of the Air Surgeon  
Headquarters Army Air Forces  
Washington, D. C.*

This article is the eighth in a series describing the Aviation Psychology Program of the Army Air Forces. Seven previous articles (1, 2, 3, 4, 5, 6, 7) have dealt with the Aviation Psychology Program as of October 1943; history, organization, and procedures at Psychological Research Unit No. 1; research program on psychomotor tests at Psychological Research Unit No. 2 and the Department of Psychology, School of Aviation Medicine; organization and research activities of Psychological Research Unit No. 3; the Aviation Cadet Qualifying Examination; history, organization, and research activities of the AAF Psychological Test Film Unit; and psychological activities in the AAF Training Command. The purpose of the present article is to describe the organization and functions of the AAF Aviation Psychology Program as of the thirtieth of June 1945, to present the basic research policies and postulates of this program, and to present a brief sketch of the research mission of the various units of the Aviation Psychology Program. It is planned that future numbers of this series will deal with the activities of certain units outlined in this article and not described in detail in previous reports.



## FUNCTIONS OF THE AVIATION PSYCHOLOGY PROGRAM

The general functions listed for the Aviation Psychology Program appear in AAF Regulation No. 20-59. This Regulation states that the Aviation Psychology Program will carry out the following types of activities,

- a. Development and refinement of an Army Air Forces Qualifying Examination, to be used in screening applicants for aircrew duty.
- b. Development and refinement of a battery of tests for the original classification of men for the various types of aircrew assignments, and administration of this battery to applicants for aircrew training.
- c. Development of procedures and tests for supplementary classification and utilization of aircrew members and of complete crews for leads, instructor, or other special assignments and administration of these tests to appropriate groups.
- d. Provision of technical assistance in the development of improved proficiency measures for use in evaluating selection procedures and the results of training.
- e. Follow-up of personnel in training, operational training, and combat to determine what measures of aptitude or proficiency are effective in predicting later success.
- f. Interviewing, testing, and counselling combat returnees in convalescent hospitals to assist in the planning of appropriate convalescent activities for returnee personnel.
- g. Investigation of variations in training materials and procedures, as requested by training authorities, in order to permit improvements in training procedures.

In addition to these functions, research is planned and several studies are underway concerning problems of aviation equipment. Proposed studies include the investigation of specific design problems and the determination of general principles in the use of equipment. Several projects concerned with standardization of the aircraft cockpit have been completed.

The carrying out of these general functions and also of more specific ones listed in various other official publications as presented below is assigned to a large number of units as will be described in some detail in later paragraphs.

## PRINCIPLES UNDERLYING THE AVIATION PSYCHOLOGY PROGRAM

The Aviation Psychology Program represents an experiment in coordinated research in psychology. For this reason it seems desirable to set forth the hypotheses and decisions underlying the planning and organizing of the program and also some of the operating procedures and principles which have been developed as a result of the experience of the past four years.

The two principal reasons, historically, why a coordinated research program was developed rather than a single strong centralized group or a number of relatively independent units were (1) the natural army framework which emphasizes the separation of policy-making and operations and (2) the decision that the research program should be intimately associated with the service or operating activities. This decision was based on the idea that research personnel should avoid participation in activities not essential to research, but should be close enough to field activities to obtain a clear picture of operational problems.

Other ideas which were postulated in developing the original plans for the Aviation Psychology Program are given below. The first of these ideas led to the decision to concentrate on *research* rather than *service*. This point was that personnel with professional training in psychology and scientific methods can make their greatest contribution by doing research on the psychological aspects of fundamental problems of design of military equipment, personnel selection, classification, training, and the utilization of personnel in operations.



Although such professional personnel would doubtless render valuable service as instructors, interviewers, technicians, examiners, statisticians, executives, and administrators, it was believed that their abilities are more adequately utilized in developing new techniques and establishing new facts as the basis for revision of general policies and procedures.

The other fundamental postulate was that the research program should be carefully planned and articulated. The broad plan for research was in terms of areas of activity rather than specific projects since the process of developing procedures was regarded as a continuous evolution and final solutions were not expected. It was believed that the planning and the delegation of responsibility for specific areas of research should be based on comprehensive knowledge of the total situation. This should include such information as is usually available only in the highest headquarters concerning general plans, requirements, and problems, and the special abilities of the personnel available to do this work.

The experience of the past few years indicates that delegation of responsibility for a broad area for research together with a system of circulating proposals and reports, including progress reports, enables the supervisors in headquarters to make sure that the problems and responsibilities are clearly understood and makes it possible for experts in other units to contribute to projects in which they are interested and to profit from current findings.

The supervision of the projects by means of review of reports, priorities and deadlines has as its primary purpose the obtaining of research findings which can be immediately translated into action. Experience indicates that research studies instigated at the request of higher headquarters or developed in cooperation with them are much more likely to result in action than studies carried out in the field without any appreciation of a need for information on the part of higher headquarters.

In selecting areas for research and establishing priorities the following factors are usually considered in the order indicated: (1) military importance, (2) immediacy of effect, (3) likelihood of conclusive findings, and (4) facilitation of other work.

On the basis of the above considerations early research effort (July 1941 to July 1943) in the Aviation Psychology Program was concentrated almost exclusively on selection and classification of aircrew personnel. This area was selected because it was believed that the greatest contribution to the effectiveness of the AAF in this war could be made by the immediate development of procedures for selecting in advance those individuals who would later be found most successful in the flying training schools. It was thought that changes indicated by research findings concerning the design of instruments and operating controls for planes would meet with considerable resistance since the planes were already in production and there was heavy pressure to meet production schedules. Similarly training procedures were established and the efforts of supervisory personnel were fully occupied in expanding the existing training program.

During the initial period of the program, this country was not engaged in combat operations and for some time after this country's entrance into the war, such a small number of personnel were deployed that substantial research in this area was impractical. It was not until combat operations had increased in scope and become more stabilized in type that a significant amount of research could be done on the problem of greatest ultimate importance—the identification of the critical requirements of combat operations. The critical requirements are defined as those which are crucial in the sense that their







presence or absence determines the success or failure of an appreciable number of combat missions. Such requirements refer to procedures in all of the general areas of research listed above. Without knowledge of combat effectiveness it is difficult to do definitive research in any of these areas.

The fact that a large proportion of aircrew personnel were eliminated in training afforded an immediately available if not entirely valid criterion for selection and classification procedures. The thorough and repeated evaluations on which graduation and elimination were based did seem to provide a valuable basis for initial research. Furthermore, if selection procedures were not developed relatively early it would be impossible to validate them against combat success.

By July 1943, considerable progress had been made with regard to the problems of selection and classification and the approval of the staff of the Commanding General, Army Air Forces was obtained to extend the research program of Aviation Psychologists to include problems of evaluation of aircrew proficiency, training, redistribution, and combat operations. This led to the establishment of a number of new units in the Training Command, the Personnel Distribution Command, and later in the Continental Air Forces. The functions and general nature of the various component groups of the Aviation Psychology Program including these new units are briefly described in the following sections.

### ORGANIZATION, FUNCTIONS, PERSONNEL AND RESEARCH PROJECTS

The accompanying organization chart presents a schematic diagram and over-all picture of the activities of the Aviation Psychology Program, including the titles of the various units and their addresses. The paragraphs that follow present a more detailed breakdown of this organization chart, including a listing of major functions, officer personnel, and typical projects of particular units. The following discussion is divided into seven major sections, headed as follows: Headquarters, Army Air Forces; AAF Training Command; AAF Personnel Distribution Command; AAF School of Aviation Medicine; Continental Air Forces; AAF Aero-Medical Laboratory; and Overseas Units.

I. *Headquarters, Army Air Forces, Office of the Air Surgeon, Research Division, Psychological Branch.* The function of this organization is policy formation, planning, coordination, and over-all supervision of the Aviation Psychology Program. The specific functions listed for the Psychological Branch are as follows:

1. Supervises the development and refinement of the initial selection test, the AAF Qualifying Examination.
2. Determines, coordinates, and controls the battery of tests for the classification of men for the various types of aircrew assignment; and supervises the administration and validation of these tests for the purpose of determining the type of duty for which individuals are best suited.
3. Investigates and recommends assignment of personnel to effect the selection and classification of aircrew.
4. Supervises and coordinates the Aviation Psychology Program in the AAF with regard to both operating activities and research functions.
5. Maintains liaison with research activities related to aviation psychology in military and civilian organizations in the United States and Allied nations.

Dissemination of information concerning psychological activities and research in agencies outside of the Aviation Psychology Program is achieved by



by means of the *Aviation Psychology Abstract Series* prepared by Dr. William O. Jenkins of the Psychological Branch.

The Chief of the Psychological Branch is Colonel John C. Flanagan, and the personnel are Major Robert L. Thorndike, Major Anthony C. Tucker, and Dr. William O. Jenkins.

II. *AAF Training Command.* The Psychological Section, Office of the Surgeon, Headquarters, AAF Training Command, is responsible for supervision of the Aviation Psychology Program within that Command. In addition an IBM installation used for maintaining records is located here (7). The specific functions for this Command as listed in AAF Letter 20-101 may be enumerated as follows:

- a. Administration of a battery of aptitude tests to applicants for aircrew training to determine the specialties for which each man is qualified, and preparation of recommendations for aircrew assignment.
  - b. Administration of tests of aptitude and proficiency to special groups of aircrew trainees and graduates, to be used in determining further classification and special assignment, as may be directed by Headquarters, AAF. Preparation of recommendations for assignment of these personnel.
  - c. Development of new aircrew aptitude tests, administration of these tests for research purposes to appropriate groups of aircrew applicants and trainees, and systematic follow-up to determine the effectiveness of these tests in predicting success in aircrew training.
  - d. Maintenance of systematic records of test results and training success and carrying out analyses of these data and of their relationships.
  - e. Development and improvement of objective methods of evaluating proficiency in the various aircrew specialties.
  - f. Experimental study of variations in training procedure, in accordance with the needs of training personnel, in order to permit improvements in training procedures.
- The Officer personnel of the Psychological Section, Headquarters, AAF Training Command, are as follows: Colonel Frank A. Geldard (Chief), Lt. Colonel A. Paul Horst, Lt. Colonel Walter L. Deemer, Major Philip H. DuBois, Major Beverly von Haller, Gilmer, Major S. Rains Wallace, Captain Armen A. Alchian, Captain Leonard Berwick, Captain George B. Simon, 1st Lieut. Julien V. Weston, 1st Lieut. James W. Dawson and CWO James Ozburn.

The mission of carrying out of the functions listed above is assigned to a number of specific units as may be seen from the organization chart. The units of the Training Command are treated briefly in the following paragraphs.

*Psychological Research Unit.* This unit is responsible for classification test development, administration, and validation.

The Chief of the Psychological Research Unit is Lt. Colonel J. P. Guilford, and the officer personnel are Major William E. Walton, Captain Frank H. Boring, Captain Lloyd G. Humphreys, 1st Lieut. William A. McClelland, 1st Lieut. John T. Cowles, 1st Lieut. John T. Dailey, and 1st Lieut. John I. Lacey. Dr. M. A. Wenger has also been associated with the PRU in connection with psycho-physiological studies.

*Psychological Examining Units.* The functions of the Psychological Examining Units include the administration of the aircrew selection and classification battery to applicants for aircrew training, the scoring of these tests, and the making of recommendations to the appropriate authorities concerning the qualifications of applicants.



The officer personnel at the various PEU's are as follows: *Psychological Examining Unit, Keesler Field, Mississippi*: Captain Walter F. Grether, (Chief), 1st Lieut. Fred H. Rohles, Jr., 1st Lieut. John H. Straka, 1st Lieut. Evan L. Wolfe, and 2nd Lieut. David Holt. *Psychological Examining Unit, Buckley Field, Colorado*: Captain Jay R. Brick, Captain Joseph E. King, Jr., Captain William F. Long, Captain Francis H. Thomas, 1st Lieut. Franklin Bacon, Jr., and 1st Lieut. Solomon S. Lieberman. *Psychological Examining Unit, Amarillo, Texas*: Captain Philip I. Sperling (Chief), Captain Mybert E. Broom, Captain Vergil M. McIntosh, 1st Lieut. Zed H. Burns, 1st Lieut. Wilbur R. King, and 2nd Lieut. Norman E. Michel, Jr. *Psychological Examining Unit, Maxwell Field, Alabama*: Captain Reuben A. Baer (Chief), 1st Lieut. Malcolm G. Dickinson, and 2nd Lieut. John E. French.

*Psychological Test Film Unit.* The PTFU is responsible for the development of motion picture selection, classification, and proficiency tests. In addition, considerable work has been done by this unit on problems of aircraft recognition and the use of motion pictures as educational and training devices.

The Chief of the PTFU is Major James J. Gibson, and the officer personnel are 1st Lieut. Ralph M. Eisenberg, and 1st Lieut. Robert M. Gagne.

*Psychological Research Project (Pilot).* The functions of PRP (Pilot) include the development of pilot proficiency measures, research in the selection of instructors, and training research in the pilot area. Specific research projects are under way on the development of an objective scale of flying skill, the development and validation of instructor selection tests, the development of pencil-and-paper proficiency tests, and the study of various criteria of pilot performance.

The officer personnel of this unit are Major Neal E. Miller (Chief), Captain William V. Hagin, Captain Richard P. Youtz, 1st Lieut. Stanford C. Erickson, 1st Lieut. William E. Galt, 2nd Lieut. Harold H. Hagy, and 2nd Lieut. Ralph E. Showalter.

*Psychological Research Project (Navigator).* PRP (Navigator) is responsible for research in proficiency measurement, training, and instructor selection in the area of aerial navigation. Specific projects include the evaluation of certain navigation training devices, the development of pencil-and-paper proficiency tests, and the study of criteria of navigator proficiency and instructor performance.

The personnel of this unit are Captain Launor F. Carter (Chief), 1st Lieut. Frank J. Dudek, 1st Lieut. Seymour T. Friedman, 1st Lieut. Ruby E. Michael, and 1st Lieut. William A. Zielonka.

*Psychological Research Project (Bombardier).* The functions of PRP (Bombardier) include research on proficiency measures and on instructor selection, and training research studies of certain bombardier activities. Specific projects include the development, administration, and analysis of proficiency tests; development of measures of proficiency in aerial bombing; validation of bombardier instructor selection tests; and experimental investigations of various phases of the bombardier's activities.

The Chief of this unit is Major Edward H. Kemp, and the officer personnel are Captain Albert P. Johnson, 1st Lieut. William W. Grings and 1st Lieut. Stanley F. Swenson.

*Psychological Research Project (Radar).* PRP (Radar) is responsible for the development and tryout of selection tests and proficiency measures for



airborne radar observers. Specific research projects include job analysis, validation of printed and apparatus tests, and research in instructor selection.

The Chief of this unit is Captain Stuart W. Cook, and the officer personnel are Captain Horace R. Van Saun, 1st Lieut. Stuart Lottier, 2nd Lieut. Lewis G. Carpenter, Jr., and 2nd Lieut. George S. Klein.

*Psychological Research Project (Combat Crew).* The functions of PRP (Combat Crew) include the making of recommendations concerning the matching of individuals for bombardment crews and also concerning which crews will be designated as potential lead crews. This unit was recently activated, and research plans call for studies of variables entering into the lead crew aptitude score and the preparation of research data for use by the Continental Air Forces.

The Chief of this unit is Major William M. Lepley, and the officer personnel are 1st Lieut. Avrum H. Ben-Avi, 1st Lieut. Maurice Deigh, 1st Lieut. Byron B. Harless, and 1st Lieut. Sol M. Roshal.

*Psychological Research Project (Flight Engineer).* This project has been activated very recently for purposes of performing research on the selection and training of flight engineers for B-29 Superfortresses. Research plans call for the development of selection and proficiency tests and their comparison with the various relevant criteria.

The officer personnel of this unit, headed by Major Neil D. Warren, will include 1st Lieut. John T. Cowles, 1st Lieut. John T. Dailey, and 1st Lieut. William A. McClelland.

III. *AAF Personnel Distribution Command.* The primary function of the Psychological Division, Office of the Surgeon, Headquarters, AAF Personnel Distribution Command, is supervision of the Aviation Program under the authority of that Command. Specific functions listed for the Command in accordance with AAF Letter 20-102 are as follows:

a. Administering tests to returned combat personnel to evaluate aptitude for certain special assignments, such as instructor or administrative officer, as directed by the Commanding General, AAF.

b. Interviewing, testing, and counselling returned combat personnel in convalescent hospitals to assist in the planning of appropriate convalescent activities for each individual.

c. Gathering information concerning combat effectiveness of individuals, for use in validating initial classification testing procedures.

d. Gathering information concerning psychological problems and psychological requirements for combat flying, as these are reported by returned combat personnel.

e. Carrying out such additional research studies as the Commanding General, AAF may direct.

It is also the function of the Personnel Distribution Command to prepare forms of the AAF qualifying Examination.

The Aviation Psychology Program in the AAF Personnel Distribution Command is headed by Lt. Colonel Laurance F. Shaffer, and the officer personnel at Headquarters are Major Merrill T. Roff and Captain Sidney W. Bijou.

*AAF Redistribution Stations.* There are Psychological Branches at the six Redistribution Stations, as may be seen from the organization chart. These units administer instructor selection tests and combine the results into com-



posite instructor scores, and are responsible for such specific research projects as combat validation of initial classification test scores, studies of leadership, and other research projects of this nature.

The officer personnel at the six stations may be listed as follows. *Redistribution Station No. 1, Atlantic City, New Jersey*: Captain Clarke W. Crannell (Officer in Charge), and Captain Donald W. Troy. *Redistribution Station No. 2, Miami Beach, Florida*: Major Frederic Wickert (Officer in Charge), Captain William G. Mollenkopf, and 2nd Lieut. Marquis A. Kirk. *Redistribution Station No. 3, Santa Monica, California*: Captain Merrill T. Hollinshead (Officer in Charge), 1st Lieut. Reuben Resnikoff, and 1st Lieut. William C. Stevens. *Redistribution Station No. 4, Santa Ana, California*: Captain Chester W. Harris (Officer in Charge), 2nd Lieut. James F. Kamman, 1st Lieut. Joseph R. Royce, and 1st Lieut. Malcolm J. Williams. *Redistribution Station No. 5, Camp Davis, North Carolina*: Captain Frederick B. Davis (Officer in Charge), and Captain Robert E. Murphy. (As an additional function, Captain Davis is responsible for constructing new forms of the AAF Qualifying Examination.) *Redistribution Station, Greensboro, North Carolina*: 1st Lieut. John P. Carlson.

*AAF Convalescent Hospitals.* Psychologists in the Convalescent Hospitals of the AAF Personnel Distribution Command are assigned to the Psychological Services Branch and are responsible for orienting, interviewing, testing and counselling returned combat personnel to assist in the planning of appropriate convalescent activities for each individual and as an aid to medical treatment, and research in these areas.

The eleven stations and the officer personnel assigned to them are listed below: *Convalescent Hospital, Bowman Field, Kentucky*: Captain Glen L. Heathers (Officer in Charge), Captain Robert L. Clougherty, 1st Lieut. Paul R. Diller, 2nd Lieut. John K. Hemphill, 2nd Lieut. Joseph J. Johnston, 2nd Lieut. John F. MacNaughton, 2nd Lieut. Clarence F. Willey, and WO (JG) Clark J. Kujawsky. *Convalescent Hospital, Ft. Logan, Colorado*: Lt. Colonel Hermann O. Schmidt (Officer in Charge), Captain Franklin C. Vaughn, 1st Lieut. Orval R. Johnston, 1st Lieut. William M. Wise, 2nd Lieut. Albert F. Ax, 2nd Lieut. Dwane R. Collins, 2nd Lieut. George J. Fortune, 2nd Lieut. Robert J. Keller, and 2nd Lieut. Ralph M. Rust. *Convalescent Hospital Miami Beach, Florida*: Captain Donald E. Super (Officer in Charge), Captain Chester W. Grochola, 2nd Lieut. Meredith W. Darlington, 2nd Lieut. Louis Delman, 2nd Lieut. Arthur L. Irion, 2nd Lieut. Douglas H. Lawrence, 2nd Lieut. Leslie L. Martin, 1st Lieut. Daniel D. Rayles, and 2nd Lieut. Frederick G. Tice. *Convalescent Hospital, Plattsburg Barracks, New York*: Major Edward I. Strongin (Officer in Charge), Captain Harry O. Ellison, 1st Lieut. Cecil C. Stewart, 2nd Lieut. David H. Jenkins, 1st Lieut. Herbert L. Rooney, and 2nd Lieut. A. J. Schmitt. *Convalescent Hospital, Santa Ana, California*: Major Lee E. Travis (Officer in Charge), 1st Lieut. Theron C. Bird, 1st Lieut. Joseph C. Cole, 1st Lieut. William H. Lucio, 1st Lieut. John W. Stephens, 2nd Lieut. Thomas F. Bell, 2nd Lieut. Isadore E. Farber, 2nd Lieut. Austin E. Grigg, 2nd Lieut. Dorothea E. Hilliard, and 2nd Lieut. Joseph L. Woodruff. *Convalescent Hospital, St. Petersburg, Florida*: Major George Forlano (Officer in Charge), Captain Stanley P. Berney, 1st Lieut. Martin Brown, 2nd Lieut. Seymour Klebanoff, and 2nd Lieut. Eli A. Lipman. *Convalescent Hospital, Ft. Thomas, Kentucky*: Major Harry V. McNeill (Officer in Charge), Captain Seymour P. Stein, 1st Lieut. Edward G. Brodie, 2nd Lieut. Robert Grice, 2nd Lieut. Charles W. McCracken, and 2nd Lieut. Gerald R. Pascal. *Convalescent Hospital, Ft. George Wright, Washington*: Major Henry Obel (Officer in Charge), Captain George A. Tyler, 1st Lieut. Gerald A. Ehrenreich, 2nd Lieut. Bert R. Sappenfield, 2nd Lieut. William B. Schrader, 2nd Lieut. William M. Wheeler, and 2nd Lieut. George J. Wischner. *Convalescent Hospital, Camp Davis, North Carolina*: Major Milton B. Jensen (Officer in Charge), 2nd Lieut. Garth J. Thomas, 2nd Lieut. Llewellyn N. Wiley, and



2nd Lieut. Benjamin Willermann, 1st Lt. Francis A. Winiarz, and 2nd Lt. Julian B. Potter, *Convalescent Hospital, Pawling, New York*; 1st Lieut. Morton Deutsch. *Convalescent Hospital, Cochran Field, Georgia*; Major Nicholas Hobbs (Officer in Charge) and 2nd Lieut. Thomas P. Gallagher.

IV. *AAF School of Aviation Medicine.* The Department of Psychology in the AAF School of Aviation Medicine includes a number of Aviation Psychologists who are responsible for the development of apparatus tests for use in selection, classification, and proficiency measurement. Other research areas include the study of selection procedures and measurement of proficiency in the area of aerial gunnery and studies of aircraft cockpit requirements with a view to improving the cockpit for ease, speed, and accuracy of responding to the various instruments and controls.

The Department of Psychology is headed by Lt. Colonel Arthur W. Melton and the Aviation Psychologists in this Department are as follows: Captain Judson S. Brown, Captain Jack Buel, Captain Glen Finch, Captain Moncrieff H. Smith, Jr., 1st Lieut. Joseph Weitz, and Dr. Roger B. Loucks.

V. *Continental Air Forces.* The Continental Air Forces consist of the four Air Forces in the United States and the Headquarters at Bolling Field, D. C. Psychological personnel are assigned to these five organizations and are responsible for the study of the performance of aircrew members in operational training in the Zone of the Interior and follow-up studies of initial selection and classification tests at this stage of training. The specific functions which are listed for the Aviation Psychology Program in the Continental Air Forces in AAF Letter 20-103 are as follows.

- a. Making available to commanding officers existing psychological test records, proficiency test scores, and training records, and advising concerning the use of such information in the selection of personnel for lead crew and other special types of operational training.
- b. Devising and/or administering aptitude and/or proficiency tests for the purpose of securing additional information to be used in the selection of personnel for special training.
- c. Developing measures and/or collecting data on the proficiency of individuals and/or combat crews to be used in evaluating the accuracy of selection procedures.
- d. Undertaking additional research studies that may be directed by the Commanding General, AAF or the Commanding General, Continental Air Forces.

*Headquarters, Continental Air Forces, Psychological Research Section, Office of the Surgeon.* This unit has been activated recently and is headed by Major Meredith P. Crawford. This section is responsible for supervision of research in the Psychological Sections of the four Continental Air Forces. It is planned that additional officer personnel will be assigned to this unit.

*Headquarters, First Air Force, Psychological Research Section, Office of the Surgeon.* This unit is headed by Lt. Colonel Richard T. Sollenberger, and the area in which research is most heavily concentrated is the study of fighter pilots, including validation of initial selection and classification procedures against various criteria. The officer personnel in this organization are as follows: Captain Howard D. Hadley, Jr., Captain Richard H. Henneman, and 1st Lieut. Wilse B. Webb.

*Headquarters, Second Air Force, Psychological Research Section, Office of the Surgeon.* This section specializes in research activities on follow-up studies of



bomber crews. The Chief of the unit is Major Lewis B. Ward, and its officer personnel are as follows: Captain Marion H. Brown, Captain Philip H. Mitchell, 1st Lieut. Frank E. Killian, and 1st Lieut. Philip Nogee.

*Headquarters, Third Air Force, Psychological Research Section, Office of the Surgeon.* This unit, under the direction of Major Clarence W. Brown, is responsible for research concerning crew formation, returnee utilization, and leadership. The officer personnel are: Major George F. Lehner, Captain Vernon J. Bentz, and Captain John J. DeMott, Jr.

*Headquarters, Fourth Air Force, Psychological Research Section, Office of the Surgeon.* This section is responsible for research on the selection, classification, and proficiency of night and two-engine fighter pilots in operational training. The Chief of this unit is Major Edwin E. Ghiselli, and the officer personnel are 1st Lieut. Roger W. Heyns, 1st Lieut. Robert B. Payne, and 1st Lieut. John W. Thibaut.

VI. *Psychological Branch, Aero-Medical Laboratory, Air Technical Service Command.* A unit of the Aviation Psychology Program has recently been activated at the Aero-Medical Laboratory. This unit is headed by Lt. Colonel Paul M. Fitts, Jr., and plans call for the assignment of a number of officers and enlisted men to this organization. The major mission of this unit is the study of aviation equipment in relation to the personnel which use it.

VII. *Overseas Units.* A number of units, entitled Aircrew Evaluation and Research Detachments, and several individuals have been assigned to overseas Air Forces on temporary duty for a number of months from the Aviation Psychology Program. These groups and individuals have been assigned specific responsibility for various areas of research and collection of combat information for validation against selection and classification tests. Much valuable information has been collected with regard to problems of combat duty and operations, and particularly with regard to the validation of initial selection and classification procedures against various measures of combat performance.

Units have been assigned to the European Theater of Operations, the Mediterranean Theater of Operations, and the Pacific Ocean Areas, under the direction of Lt. Colonel A. Paul Horst, Major Neil D. Warren, and Major William M. Lepley, respectively. The officer personnel of these AERD's include: Major B. von H. Gilmer, Captain Leonard Berwick, Captain Jay R. Brick, Captain Stuart W. Cook, Captain Glen L. Heathers, Captain William F. Long, Captain William G. Mollenkopf, 1st Lieut. Avrum H. Ben-Avi, 1st Lieut. William W. Grings, 1st Lieut. Byron B. Harless and 1st Lieut. Sol M. Roshal. Approximately twenty-five enlisted men also served overseas with these units. Individual officers who have served overseas as representatives of the Aviation Psychology Program are Colonel John C. Flanagan, Lt. Colonel Paul M. Fitts, Jr., Major Philip H. DuBois, Captain Roger W. Russell, and 1st Lieut. Wilse B. Webb.

#### SUMMARY OF DEVELOPMENTS IN ORGANIZATION AND RESEARCH

It appears to be in point to summarize the foregoing discussion with regard to changes in organization and in research orientation of the Aviation Psychology Program since its inception in July 1941. It can be gathered from previous discussions that the scope of the Aviation Psychology Program in its research orientation and operating services has enlarged broadly from its original aims of selection and classification for purposes of recommending assignments of individuals most likely to succeed in training, to include such areas of research as proficiency, training, special assignments, combat validation, clinical



evaluations and testing, and studies of aviation equipment. Concomitantly there has been considerable change in the organizational structure of the Program with the creation of a large number of units to handle new research problems. At the present time, there are seven general organization headings subsuming the research purposes and area of the Aviation Psychology Program: Headquarters, Army Air Forces; Headquarters, AAF Training Command; AAF Personnel Distribution Command; AAF School of Aviation Medicine; Continental Air Forces; Aero-Medical Laboratory; and Overseas Units.

### PERSONNEL

At the present time, approximately two hundred commissioned officers are assigned as Aviation Psychologists in the AAF Aviation Psychology Program. There are approximately seven hundred and fifty enlisted men, many of whom have Bachelor's or Master's Degrees in the field of psychology or education. The loyalty and hard work of these men made possible the achievements of the program. Space does not permit the listing of their names or the many important contributions made by them as individuals.

### FUTURE PLANS

Research will continue in the fields of selection and classification, training, aviation equipment, and the other areas cited above. Efforts are being concentrated on the measurement and evaluation of proficiency in operational training and combat. Through the work of PRP (Combat Crew), crews are assembled with particular emphasis on the formation and designation of potential lead crews. The performance of these crews is followed into operational training. Units are being activated in the Pacific Ocean Area to make further studies of combat requirements and combat performance.

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# ACHIEVEMENT TESTS FOR THE ARMY SPECIALIZED TRAINING PROGRAM

## STAFF, PERSONNEL RESEARCH SECTION

*Classification and Replacement Branch  
The Adjutant General's Office*

During 1943 and 1944 the Personnel Research Section of the Adjutant General's Office constructed over 140 achievements tests for use in the Army Specialized Training Program.\* Approximately one million tests were given in a space of eighteen months to more than 150,000 trainees enrolled in approximately 200 colleges and universities. Psychologists and educators have been convinced considerable interest in this wartime venture in large-scale test construction for measuring achievement at the collegiate level. This article therefore describes the purposes for which the tests were built, the circumstances which conditioned their character, the methods by which they were constructed and an evaluation of their effectiveness.

### 1. *Purpose of the Army Specialized Training Program (ASTP)*

The Army Specialized Training Program (ASTP) contracted with selected colleges and universities to provide training for enlisted men according to specified courses and curricula in engineering, medicine, military government and personnel psychology. The nation-wide testing program was instituted to evaluate the achievement of these students and to facilitate control of the content and quality of the instruction. Since institutions and instructors differ widely in their examining procedures and in the methods and content of their instruction, local grades would not be satisfactory. They do not provide the uniform yardstick necessary for measuring achievement of individual trainees enrolled in different training units throughout the country nor for comparing average achievement in the different units.† For these reasons, achievement tests, nation-wide in scope and objective in character, were required.

### 2. *The Personnel Responsible for the Achievement Testing Program*

While over-all policy and operation of the Army Specialized Training Program was a function of the Army Specialized Training Division of Army Service Forces (later the School Division under the Director of Military Training, ASF), the work of developing and administering the achievement testing program was assigned to the Personnel Research Section of the Classification and Replacement Branch of The Adjutant General's Office. This office serves the entire Army in a technical capacity and is responsible for constructing, validating and standardizing Army personnel classification tests. (See "Personnel Research Section, AGO: Development and Current Status," *Psychol. Bull.*, 1945, 42, 445-452.)

A special unit was organized within the Personnel Research Section to prepare tests for the AST program. This office constructed, published and distributed tests for the AST program. This office constructed, published and distributed tests for the AST program.

\* In March of 1944, the ASTP was drastically reduced in size. Although achievement testing has continued up to September 1945, the procedures described in this article refer primarily to the peak period from Sept. '43 through Feb. '44.

† Actually, the scores on the achievement tests were not allowed to play any part in grading at the outset of the program. Later, instructors were permitted to use these scores at their own discretion; uniform passing scores were never stipulated.



tributed all achievement tests employed in the program, and established uniform procedures for administering and scoring them and reporting on their results. It also collected and compiled operational statistics on the tests, but the responsibility for their interpretation and evaluation, and the direction of corrective measures where necessary, remained with the AST Division.

The AST test construction unit consisted of a full time staff of subject-matter specialists and psychologists trained in test construction. This staff was assisted by about 40 part-time consultants with experience in college teaching in the fields for which the tests were built.\*

### 3. The Testing Schedule

The training program was divided into two phases. In the first or basic phase, all students were given the same courses. These corresponded to typical elementary college courses in mathematics, physics, English, history and chemistry, and were preparatory to the second or advanced phase. In the latter, the curricula were specialized into medicine, engineering, personnel psychology and foreign languages and area studies. The basic phase consisted of three terms of twelve weeks each. The advanced phase varied from one to four twelve-week terms, depending upon the nature of the specialty for which the trainee was being prepared.

For practical reasons, only final examinations were constructed by the Personnel Research Section. These were built for all the courses in the basic phase and for each course in the advanced phase which was common to several curricula. In all, tests were required for about twenty different courses. Table I shows the courses for which tests were constructed and the number of forms of each test.

The frequency of testing and of developing new tests was determined by the fact that training units were divided into cycles. *Cycle I* institutions began instruction in June 1943, *cycle II* institutions in July, and *cycle III* institutions in August.† Each term of instruction lasted three months, and new terms began immediately on the completion of those preceding. Since each month marked the end of a term for a given cycle of colleges, the achievement testing program recurred on a monthly basis. Moreover, it was necessary to produce and administer a new form of each test every three months so that no test would be repeated in any institution. The introduction of these new forms effectively checked any tendency to "teach for the examination."

### 4. Description of the Tests

It is obvious that only objective tests could satisfy the requirement for uniformity of scoring standards demanded by the purpose of the testing program. In addition, certain practical considerations dictated the kind of objective tests constructed. It was necessary to make the tests as nearly self-administering as possible because of the shortage of trained testing personnel in the institutions, the pressure of time, and the large number of trainees to be examined. For the same reasons, scoring procedures had to be as rapid and simple as possible.

These considerations led to the selection of a single type of objective test

\* It may be of interest to professional psychologists that a number of these consultants, who had no previous training or experience in building objective tests, became highly proficient item-writers as a result of "in-service" experience on the ASTP project.

† As new institutions were brought into the program, each was assigned to one of the "cycles."



item throughout (except in the case of aural comprehension tests for foreign languages) and outweighed the advantages that might, theoretically, have been gained by varying the item type within the examination. Multiple choice items were found to be more adaptable and versatile than other types for framing questions differing widely in content and purpose. All test questions consisted of a "stem" or "problem" with four alternative responses, only one of which could be considered correct.

TABLE I

LIST OF AST ACHIEVEMENT TESTS AND NUMBER OF FORMS CONSTRUCTED  
JUNE 1943-MAY 1945

(Revised Forms Not Included)

<i>ASTP Course Number</i>	<i>Descriptive Title</i>	<i>Number of Forms</i>
Chemistry 205; 61	Elementary College Chemistry, Term 1	7
Chemistry 206; 62	Elementary College Chemistry, Term 2	7
Chemistry 4A	Survey Elementary College Chemistry	2
Chemistry 401	Qualitative Analysis	2
Chemistry 402	Quantitative Analysis	2
Engineering Drawing 001; 11-61	Elementary Engineering Drawing	5
English 111; 11-61, 12- 62, 13-63	Composition and Reading Comprehension	7
Language Study 755-56, 57, 58	Chinese Aural Comprehension	1
	French Aural Comprehension	2
	German Aural Comprehension	3
	Italian Aural Comprehension	2
	Japanese Aural Comprehension	2
	Russian Aural Comprehension	3
	Spanish Aural Comprehension	2
Geography 163, Term 1; 31-71	Physical Geography	6
Geography 163, Term 2	Economic Geography	4
Geography 61	Political Geography	1
History 133	Survey American History 1492-present	3
History 133, Term 1	American History 1492-1865	2
History 133, Term 2	American History 1865-1917	2
History 133, Term 3	American History 1917-present	2
Mathematics 11	Survey of Arithmetic, High School Algebra and Plane Geometry	2
Mathematics 12	*Algebra and Trigonometry (Level 1)	2
Mathematics 406; 61	College Algebra and Trigonometry (Level 2)	6
Mathematics 407	Analytic Geometry	5
Mathematics 62	Analytic Geometry and Introduction to Calculus	3
Mathematics 408; 63	Differential and Integral Calculus	8
Mathematics 4A	Survey of College Algebra, Trigonometry, Analyt- ic Geometry, and Calculus	3
Mathematics 401	Advanced Calculus	5
Physics 11	*Mechanics (Level 1)	2

\* Tests designated as level 1 are at a simpler level than those tests covering same subject matter and designated as level 2.



Physics 12	*Electricity (Level 1)	2
Physics 13	*Heat, Sound and Light (Level 1)	1
Physics 304; 61	Mechanics (Level 2)	7
Physics 305; 63	Heat, Sound, and Light (Level 2)	8
Physics 306; 62	Electricity	8
Physics 4A	Survey of Mechanics, Electricity and Heat, Sound, and Light	3
Mechanics 401	Advanced Mechanics	6
Plane Surveying 078	Principles and Methods of Surveying	2
Psychology 605	Tests and Measurements	2
Psychology 610	Statistics	2
Psychology 620	Social	1
Psychology 631	Occupations and Vocations	2

In all cases, standard machine scorable answer sheets were used. The scoring formula for all tests was simply the number of right answers; part scores or weighted scores were never used. This was done primarily to reduce the possibility of errors in scoring.†

### 5. How ASTP Tests Were Constructed

In order to produce tests which may be administered by relatively inexperienced persons, scored rapidly and easily, and still yield valid and reliable results when given on a large scale at different institutions, extreme care and precision must be exercised in construction. Moreover, since the use of objective tests had never before been demanded in an educational program of such scope, and were consequently foreign to many of the instructors, the staff felt a professional obligation to produce instruments which would give this form of test as fair a trial as possible.

A. *Test Plan.* The construction of each test began with a test plan which specified its content, form and length. It would have been desirable to plan the tests on the basis of expected outcomes of instruction, and to measure what the trainee could do with his knowledge after completing the course. However, this was not feasible since the prescribed course outlines were not always sufficiently definite concerning course objectives or expected outcomes. It was often necessary to utilize the mere subject-matter content of the syllabus as a guide in determining which areas of knowledge were to be tested. Each test plan included an estimate of the number of items to be devoted to each topic and—when possible—each course objective. In formulating test plans, the staff consulted expert opinion and made an analysis of the text books most commonly employed by the training units, the local course outlines, and local examinations. This latter information was regularly supplied by the training units to the Personnel Research Section during the first few months of the program.

\* See footnote p. 555.

† As a matter of fact, studies undertaken by the Personnel Research Section showed that the correlation between "total rights" scores and scores "corrected for guessing" (i.e., rights—1/3 wrongs) on ASTP tests was extremely high. Correlation coefficients which were obtained on three separate and representative populations of AST trainees varied from .96 to .99. As might be expected from this, the odd-even reliability coefficients based on corrected and on uncorrected scores were practically identical. Moreover, these results were not affected by the nature of the test instructions with respect to guessing. The correlation between corrected and uncorrected test scores was approximately as high for tests which encouraged guessing as for tests in which guessing was discouraged.



The length of the test was conditioned by the fact that each testing period lasted only two days, and most trainees took six tests within that time. The average test could therefore not consume more than two hours. However, the average item in a social science test requires less time than the average item in a physical science or mathematics test. Moreover, the physical sciences and mathematics courses were considered by the ASTD to be the more important phases of instruction. Consequently, a time limit of approximately two hours was set for the mathematics and physical science tests, and a limit of approximately one and a half hours for the social science tests.

Since it was decided that these tests should be of the "work-limit" variety, the number of items in each was limited to that which almost all trainees could finish within the specified time limit. This was determined empirically from reports by training units, stating the number of trainees who finished each test within specified time limits, short of the maximum allowed, and also the number who failed to finish within the maximum time limit. On the basis of this evidence 50 to 65 items were found practicable for mathematics tests, 50 to 60 for advanced mechanics, 60 to 90 for the less advanced physical science courses, and 90 to 125 items for tests in English, history and geography.

All test plans were reviewed by representatives of the Army Specialized Training Division to insure conformity with the prescribed course outline.

B. *Writing and Review of Test Items.* With some exceptions,\* all items were written in the Personnel Research Section, either by permanent staff members or by expert consultants. Although textbooks were used as general guides, as indicators of questions, and as references in checking accuracy, particular care was taken to avoid phrasing items in textbook terms or basing them on the particular point of view or emphasis of any given text.

All items were given a preliminary review by test technicians and consultants, working in collaboration. Each item was reviewed not only for its technical soundness but also for its significance in contributing to the measurement of the test's objectives. In addition, items were carefully checked by the test technician for conformity with the principles that govern the construction of valid multiple-choice items: the posing of a central problem, plausibility of distractors, clarity and economy of phrasing, the complete absence of irrelevant clues to the correct answer, such as length of correct alternative, grammatical construction, homogeneity of alternatives, etc.

The chief aim of these preliminary reviews was the improvement of individual items—of which approximately twice as many were constructed for each test as were required. The complete set of preliminary items were mimeographed in test form and then sent to two or three expert consultants for further review. The consultants were requested to examine each item for the following attributes: the incontestable *accuracy* of the correct answer and the equally incontestable *inaccuracy* of the other alternatives; the clarity and precision of the technical language employed in stating each item; the appropriateness of the item to the course level. Moreover, each reviewer was requested to take the test and record his answers to each question. This procedure compelled the reviewer to scrutinize each item realistically and closely as a problem he himself had to solve. Faults which had otherwise escaped notice were clearly revealed by this means.

When the reviewers returned the trial tests with their comments, the criti-

\* These exceptions consisted of a small number of items taken from tests built by field test construction centers, established in selected colleges and universities for the purpose of supplementing the pool of items prepared by Personnel Research Section.



cisms were collated, the poorer items weeded out, and the more useful ones revised when necessary. The final set of items for each test was keyed to a standard scoring key and rechecked both before and after printing. Prior to being printed, however, the test was once more administered to an expert consultant who had not previously taken it. The scoring of his answer sheet provided a final check. This rather elaborate procedure was introduced because experience with the very early tests showed that the combined judgment of two or more subject-matter experts was required to produce items of unequivocal accuracy.

C. *Item Analyses.* The preparation of the tests for the January 1944 testing period was complicated by the introduction of item analyses. This was done chiefly to improve the reliabilities of some of the tests—which at first had been unsatisfactory. In some cases, tests had been too difficult because the limitations imposed by the accelerated nature of the courses had not been fully appreciated; in other cases, the indefiniteness of course outlines had led to the inclusion of items on topics not covered by a majority of instructors. Moreover, empirical confirmation of the judgment of test-constructors and reviewers was needed concerning tests (particularly in the fields of English and history) where the material tended to be controversial and where items might reflect the bias and personal taste of the test-technician. Objectivity requires more than the intention to be objective.

In order to secure item analysis data, each test was administered in experimental form to a representative sample of training units three months before it was scheduled for national administration. At this stage, the test still contained twice as many items as were included in its final form. The items were therefore divided into two comparable series, each of which was given to half the trainees in each unit participating in the trial run. Data were analyzed to give a measure of item difficulty and to show the capacity of each item to discriminate between the 27% of the sample who made the highest total test scores and the 27% who made the lowest scores.

These results were used along with the reviewers' judgments in selecting and revising items for inclusion in the final form of the test. Copies of the experimental forms were also sent to selected instructors in ASTP units throughout the country and their comments weighed in the final assembly of the test.

D. *Test Standardization.* The tests prepared in this same period were also standardized by administering the final forms to representative samples of trainees one month before their release. This enabled the predetermination of percentile rank equivalents for each raw score and the preparation of conversion tables prior to the distribution of the tests for nation-wide administration. Thus it was possible for each instructor to compare the performance of his trainees with the national norms as soon as his test papers were scored.

#### 6. *Administration and Reporting of Results on AST Achievement Tests*

The security of test materials was carefully guarded by regulations enforced through the military commandant of each ASTP unit. Testing conditions were made as uniform as possible through a detailed manual of directions distributed to each unit. Moreover, a field staff attached to the AST unit of the Personnel Research Section made periodic visits to the various institutions to help insure uniformity of testing conditions in all training units.

In order to compare the effectiveness of instruction offered by the various colleges and universities in terms of the achievement of their students on the tests, national test norms were required. These were based on distributions of raw test scores prepared and submitted by each institution, separately by term



and curriculum for each test administered. These distributions were combined into national frequency distributions, from which national means, standard deviations, and estimates of reliability were derived. For comparison with these national results, mean raw scores were computed for each institution by subject, term and curriculum. Since variations in mean achievement from institution to institution might be considered in part a function of variations in the ability of the men, allowance had to be made for this factor. Accordingly, distributions of standard scores made by trainees on the Army General Classification Test were submitted by each institution separately by term and curriculum. These distributions were combined and analyzed parallel with the achievement test results to yield national and local means. The results of the program were summarized each month and transmitted to the AST Division where the actual comparison and evaluation of individual units was made.

### 7. *Validity and Reliability of Tests*

An educational achievement test is valid to the extent that it discovers how much the student has learned in the course he has completed. The validity of national achievement tests designed to evaluate training effectiveness depends upon the uniformity of such training. If instruction differs from class to class or institution to institution an examination valid for one must necessarily be invalid for others. Uniformity is conditioned by: (a) clearly stated objectives or outcomes of instruction—well defined "expectations of behavior"; (b) syllabi which are definite, complete, and clear enough to be followed by all instructors and designed to achieve specific objectives; (c) circumstances of instruction which permit prescribed course outlines to be followed and stated objectives to be attained.

None of these conditions was consistently present throughout the AST program. In the beginning, courses were not always precisely defined either in terms of broad objectives or in the details of content. And even where these were clearly stated there were instructors who considered them as advisory rather than mandatory. In general, where content had crystallized through usage or tradition, as in mathematics and the physical sciences, there was little variation, while the courses in English, history and geography, where the controlling influence of custom has not been strong, were largely lacking in uniformity. The difficulty of matching test content to instruction in such circumstances was reflected in the instructor's comments on the tests produced during this period. It was evident that these early tests were generally unsatisfactory.

In the next period three things were done to effect a closer relation between test and instruction: (a) course outlines were revised and made more definite; (b) the item analyses referred to above were instrumental in isolating the core of essential content common to all training units; (c) preliminary forms of tests were reviewed by instructors whose comments were used in the selection of items for the final forms.

As soon as these three remedial measures had taken effect, there was a marked change in instructor evaluations. The later tests were judged to be much better matched with the courses as taught and to be more highly satisfactory measures of student achievement. It was also reported that these later tests correlated highly with student performance throughout the course.\*

\* These reports were confirmed by statistical analyses. One such study (made at a period when achievement test scores could not be used in determining course grades) on 600 term 1 trainees showed correlations from .53 to .64 between instructors' final



These improvements were also reflected in higher test reliabilities. Estimates of reliability of the early tests in such courses as English, geography, and chemistry had been low. After instruction had become more standardized, a better matching between test and course had been effected, there were marked improvements in reliability. The following estimates are typical of later forms of the ASTP standardized tests.

<i>Course</i>	<i>No. of Items</i>	<i>Estimate of Reliability</i>
Chemistry	75-90	.85-.90
English	90-115	.75-.85
Geography	125	.80-.85
History	95-100	.80-.90
Mathematics	50-65	.80-.85
Physics	70-80	.80-.90

It is interesting to note that whereas mathematics tests of 50 items consistently yielded reliability estimates of approximately .85, twice as many items were required to achieve equivalent reliability for the geography tests. The explanation again lies in the nature of the syllabi for these courses and their traditional content. For similar reasons the English tests, despite their greater length, frequently failed to yield reliabilities as high as those for the shorter tests in mathematics, physics or chemistry.

### 8. Conclusions

The experience gained in the ASTP testing program points toward two related conclusions.

1. National achievement testing programs are not likely to succeed unless course outlines and teaching emphases are standardized throughout all participating institutions. Such standardization can be secured only through a careful formulation of the concrete and explicit objectives of the training, and the specific minimum information and skills to be acquired in the course. Moreover, a close and continuous working relationship between the central administrative staff of such a program and the training institutions involved should be maintained in order to insure a clear and uniform interpretation of the function and content of the prescribed syllabi, as well as adjustments required in them by the practical conditions of instruction.

2. All items in such national achievement tests must pertain to a nucleus of course content selected because it is fundamental and indispensable for achieving the objectives decided upon.

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grades and achievement test scores in chemistry, mathematics, physics, and history. Correlations for English and geography where the prescribed curricula permitted differing interpretation and emphasis, were consistently lower. Moreover, intercorrelations between achievement test scores were higher than intercorrelations between instructors' grades.

In this connection, it is of interest to note that the national achievement test scores were found to correlate more highly with aptitude test scores than did instructors' grades. The correlation between the aptitude test specially designed by the Personnel Research Section to select candidates for the ASTP (OCT-2, X-3) and combined achievement test scores (in chemistry, physics, and mathematics) was .74, whereas the comparable correlation with instructors' grades used as criteria was significantly lower: .45 to .55. These results parallel closely those reported for the Navy V-12 program by Crawford and Burnham in the May, 1945 issue of the *Psychological Bulletin*.



# PSYCHOLOGICAL TEST CONSTRUCTION AND RESEARCH IN THE BUREAU OF NAVAL PERSONNEL: DEVELOPMENT OF THE BASIC TEST BATTERY FOR ENLISTED PERSONNEL

STAFF OF THE TEST AND RESEARCH SECTION  
*Training, Standards and Curriculum Division,  
Bureau of Naval Personnel*

The Test and Research Section, Standards and Curriculum Division, Bureau of Naval Personnel, is responsible for developing and officially approving psychological and educational tests for use in the Navy's personnel and training programs, and for conducting research on problems of placement and training of naval personnel. The first report of this series, in the *Psychological Bulletin* for July 1945,<sup>1</sup> outlined the program and accomplishments of the Test and Research Section. This report deals with the development of the United States Navy Basic Test Battery for enlisted personnel, and with its use in selecting enlisted personnel for technical naval training and in classifying them for naval duties. A subsequent report will deal with the validation of the Basic Test Battery.

## DEVELOPMENT OF THE BASIC TEST BATTERY

In 1942, in most of the recruit training programs, a battery of tests was used for selecting recruits for the enlisted Naval Training Schools where they were trained for such naval ratings as Electrician's Mate, Fire Controlman, Gunner's Mate, Torpedoman, Quartermaster, and Signalman. Included in the old battery of tests were a General Classification Test, and tests of mechanical aptitude, arithmetical computation, spelling, radio code, and English. Studies of these tests, made in 1942, showed that they were not effective in meeting the needs of the Navy. New tests for selection of recruits for training were required.

Early in 1943, a Test Construction Group was established in the Standards and Curriculum Section of the Bureau of Naval Personnel to develop a coordinated program of constructing and validating selection and classification tests. Later a Research Group was established.

In cooperation with personnel from a Project of the National Defense Research Committee, the staff of the Test Construction Group determined that new tests of general verbal ability, mechanical aptitude and arithmetical reasoning ability would be desirable. In view of the expansion in billets requiring the mastery of a great deal of mechanical skill and information, tests of reading and of mechanical and electrical knowledge were also considered to have potential value. At that time, tests of spelling, radio code aptitude, and English were held to be of less value for immediate inclusion in a basic battery. Late in January 1943, work was begun on the development of the following tests:

- General Classification Test, with sections on sentence completion, analogies and opposites,
- Reading Test,
- Arithmetical Reasoning Test,
- Mechanical Aptitude Test, with sections on block counting, mechanical comprehension, and surface development,

<sup>1</sup> Psychological Testing and Research in the Bureau of Naval Personnel: Work of the Navy's Test and Research Section. *Psychol. Bull.* 1945, 42, 433-444.



Mechanical Knowledge Test, with sections on mechanical and electrical information and mechanical and electrical tool relationships.

By the end of March 1943 the experimental forms had been developed and administered to a selected sample of recruits in each of six Naval Training Stations. On the basis of statistical analyses, the above listed tests were revised and ready for routine administration in June 1943. Later, tests of clerical aptitude, spelling and radio code aptitude were added to the Basic Test Battery. The original five tests, commonly yielding six scores, are now available in three standard forms each, the latter three tests in two forms each. A Fleet Edition of six tests of the Basic Test Battery has also been prepared, including the General Classification Test, Arithmetical Reasoning Test, Mechanical Aptitude Test, Mechanical Knowledge Test, Electrical Knowledge Test, and Clerical Aptitude Test. Descriptions of the Basic Test Battery and the Basic Test Battery (Fleet Edition) follow.

### DESCRIPTION OF BASIC TEST BATTERY

<i>Name and Description of Test</i>	<i>Number of Items<sup>2</sup></i>		<i>Time Limit in Minutes</i>	
	<i>Part Test</i>	<i>Total Test</i>	<i>Part Test</i>	<i>Total Test</i>
<b>GENERAL CLASSIFICATION TEST</b>		100		33
<i>Part 1 Sentence Completion</i>	30		10	
Consists of a series of incomplete sentences, each of which is followed by five possible completing terms. The task is to select the correct term to complete the sentence.				
<i>Part 2 Opposites</i>	30		8	
Consists of a series of terms, each of which is followed by five other terms. The problem is to select from among the five terms the one which is most nearly opposite in meaning to the first term in the list.				
<i>Part 3 Analogies</i>	40		15	
Consists of a series of incomplete analogies, each of which is followed by five terms. The task is to select the correct word to complete the analogy.				
<b>READING TEST</b>		30		25
Consists of a series of passages about material related to Navy life, each of which is followed by a number of multiple choice responses. The task is to select for each test item the best response from five.				
<b>ARITHMETICAL REASONING TEST</b>		30		30
Consists of a number of problems in arithmetic. Each problem is followed by five possible answers. The task is to select the correct answer to each problem.				

<sup>2</sup> Norms on all tests and part tests have been established in terms of Navy Standard Scores where the mean is assigned a value of 50 and the standard deviation a value of 10.



Name and Description of Test	Number of Items		Time Limit in Minutes	
	Part Test	Total Test	Part Test	Total Test
MECHANICAL APTITUDE TEST		129		34
Part 1 Block Counting		45		6
Consists of a stack of blocks, some of which are lettered. The task is to count the number of blocks which touch each lettered block.				
Part 2 Mechanical Comprehension		44		20
Each item presents an illustration of a mechanical situation. The task is to answer correctly a question about each situation.				
Part 3 Surface Development		40		8
Consists of a series of flat patterns, each of which can be folded up to make a solid object, a picture of which is also shown. The task is to match certain lines in the flat pattern with the corresponding edges in the picture of the solid object.				
MECHANICAL KNOWLEDGE TEST		135		37
Part 1 Tool Relationships				
Electrical		25		6
Mechanical		30		6
Each item consists of one numbered picture followed by three lettered pictures in lines. Each picture shows some tool or piece of apparatus. The task is to designate the lettered picture which is most closely associated with the numbered picture at the beginning of the line. Some of the items are pictures of electrical equipment, the others of mechanical equipment.				
Part 2 Information				
Electrical		35		12
Mechanical		45		13
Each item consists of a question to which four answers are given. The task is to pick the correct answer for the question. Some of the items refer to mechanical information, the others to electrical information.				
The following raw scores are most commonly obtained from the test:				
a. Electrical Score (60)				
Tool Relationships plus Information				
b. Mechanical Score (75)				
Tool Relationships plus Information				
c. Tool Relationships Score (55)				
Electrical plus Mechanical				
d. Information Score (80)				
Electrical plus Mechanical				



<i>Name and Description of Test</i>	<i>Number of Items</i>		<i>Time Limit in Minutes</i>	
	<i>Part Test</i>	<i>Total Test</i>	<i>Part Test</i>	<i>Total Test</i>
CLERICAL APTITUDE TEST		213		13
<i>Part 1 Alphabetizing</i>	55		4	
For each item the task is to insert one word into a group of four alphabetized words in such a position that the five words will be in alphabetical order.				
<i>Part 2 Name Checking</i>	83		5	
Each item consists of a pair of names. The task is to determine whether or not the two names in each pair are identical in form, spelling and punctuation.				
<i>Part 3 Number Checking</i>	75		4	
Each item consists of a pair of numbers. The task is to determine whether or not the two numbers in each pair are identical.				
SPELLING TEST		50		12
Each item consists of five words, one of which is misspelled. The task is to select the misspelled word.				
RADIO CODE TEST		150		30
Consists of a phonograph disc with International Morse Code characters recorded thereon. Three letters are presented repeatedly to the subjects. The subjects are then tested on their ability to recognize the letters when they are presented at varying rates of speed.				

### USES OF THE BASIC TEST BATTERY

The primary use of the Basic Test Battery has been for selection of enlisted personnel for Navy schools. The tests are administered to all recruits in Naval Training Centers. On the basis of test scores and other factors the decision is made as to whether or not an individual should be recommended to a Naval Training School for some type of special technical training. Each test of the Basic Test Battery has demonstrated its usefulness in this selection process, but certain of the tests have proved to be more effective than others in selecting for specific types of schools. Scores on the Arithmetical Reasoning Test, for example, are significant in predicting success in Basic Engineering and Electrical schools, but are of less value than scores on the Reading Test in selecting for Radar Operator and Fire Controlmen schools. Cutting scores on one or more of the tests (scores below which success in school is considered to be unlikely) have been established for 46 types of enlisted training programs.

A second use of the Basic Test Battery is to provide a measure of the quality of enlisted men and women who enter the Navy. The test scores made by all recruits in each Naval Training Center are forwarded every two weeks to the Test and Research Section. Statistical summaries are prepared each month,



## DESCRIPTION OF BASIC TEST BATTERY (FLEET EDITION)

Name and Description of Test <sup>3</sup>	Number of Items in Each Test	Suggested Time Limit in Minutes <sup>4</sup>	
		For Each Test	For Each Book
BOOK ONE			55
Directions		5	
Electrical Knowledge Test	45	10	
Mechanical Knowledge Test	45	10	
(minus verbal items)			
General Classification Test	70	30	
(minus opposites items)			
			60
BOOK TWO			
Directions		5	
Mechanical Aptitude Test	50	20	
Arithmetical Reasoning Test	30	35	
			10
BOOK THREE			
Clerical Aptitude Test	250	10	

showing the mean, standard deviation, and range on each test made by recruits in each Naval Training Center and by the total recruit population. Comparisons may thus be made between the recruits at different Naval Training Centers for the same period and for different times of the year. This information may be used by a number of Navy activities in planning and evaluating their programs. Tables I and II illustrate for the General Classification Test, Form 2, the types of summaries prepared.

A third use of the Basic Test Battery is at advanced classification centers and aboard ship where test scores on one or more of the tests are taken into consideration in the assignment of men to billets or stations. For example, test scores of 55 or more on the General Classification Test are considered desirable for Gun Captains. All candidates for submarine service are required to have a score of 50 or above on the General Classification Test.

TABLE I

NAVY STANDARD SCORES ON BASIC TEST BATTERY (General Classification Test, Form 2)  
MADE BY RECRUITS AT NAVAL TRAINING CENTERS FOR THE PERIOD JANUARY 1944  
THROUGH FEBRUARY 1945

Station	N	M	$\sigma$	Range
A	84,107	49.13	10.49	21-76
B	108,796	51.45	9.87	21-76
C	287,923	51.21	11.15	21-76
D	178,328	50.56	10.05	21-76
E	117,730	48.70	10.68	21-76
All Stations	776,884	50.49	10.64	21-76

<sup>3</sup> Items for each test are of the same type as for corresponding test of Basic Test Battery.

<sup>4</sup> Time limits for the separate tests in Book One and Two are suggested time limits only. The subjects are timed on each book as a whole.



TABLE II

TREND IN NAVY STANDARD SCORES ON BASIC TEST BATTERY (General Classification Test, Form 2) MADE BY RECRUITS AT ALL NAVAL TRAINING CENTERS BY MONTHS  
JANUARY 1944 THROUGH FEBRUARY 1945

Month	N	M	$\sigma$	Range
1944				
January	88,320	48.22	10.59	21-76
February	62,298	48.99	10.37	21-76
March	84,426	49.48	10.65	21-76
April	81,898	50.07	10.55	21-76
May	96,161	51.00	10.64	21-76
June	68,741	53.38	10.31	21-76
July	47,335	54.42	10.52	21-76
August	33,932	52.68	10.44	22-76
September	52,109	51.26	10.56	21-76
October	35,105	50.32	10.35	21-76
November	28,302	49.66	10.10	21-76
December	33,139	49.01	10.13	21-75
1945				
January	31,997	49.34	10.21	22-76
February	33,121	49.92	10.53	21-76

### ANALYSES OF THE BASIC TEST BATTERY

The Basic Test Battery has been subjected to item analyses, time limit studies, determination of reliabilities, development of norms, validity studies, inter-correlation studies, and factor analyses. The results of some of these studies are summarized below.

*Item Analyses.*<sup>5</sup> The sample populations for the item analyses of the preliminary forms were selected to be representative of the total recruit population. Item analyses were made by computing for each item of a test, the mean total score on the test made by persons who selected choice one, the mean total score made by persons who selected choice two, the mean total score made by persons who selected choice three, and so on. In addition the mean total score made by persons who omitted the item was calculated. The value of each item was determined by comparing the mean total score made by persons who selected the correct response with the mean total score made by persons who selected each of the wrong responses, or who omitted the item altogether. A satisfactory item was considered to be one which showed:

- a reasonable number of omissions,
- a mean score made by those selecting the correct response which was higher than the total mean score, and
- a set of efficient distracting responses.

On the basis of the item analyses, each of the items was rejected, revised, or retained as originally stated, and Form 1 of the battery was prepared for use. On Forms 2 and 3 of all tests, and on the Fleet Edition of the Basic Test Battery, with the exception of the Clerical Aptitude Test, item analyses were made by comparing the upper and lower quarters.

<sup>5</sup> This section of the report deals with analyses of the General Classification Test, Reading Test, Arithmetical Reasoning Test, Mechanical Aptitude Test, and Mechanical Knowledge Test.



*Time Limit Study.*<sup>6</sup> For the determination of the optimum time limits, the preliminary form of each test was administered to a carefully selected sample population of recruits in a Naval Training Station. Three experimental time limits were used for each test or part test: a long time limit which was thought to be sufficient to permit nearly all recruits to attempt every item, and two shorter time limits. The procedure was to call "Mark" at the end of the briefest

TABLE III

ESTIMATED RELIABILITY COEFFICIENTS OF BASIC TEST BATTERY BASED UPON DATA OBTAINED FROM ROUTINE ADMINISTRATION TO RECRUITS

Name of Test	Estimated Reliability Coefficients Based on Data for Single Form*			Reliability Coefficients Based on Data for Two Forms of the Same Test	
	Form 1	Form 2	Form 3	Forms 1 & 2	Forms 2 & 3
General Classification Test	.91 (200)**	.95 (200)	.96 (250)	.90 (450)	.93 (500)
Reading Test	.82 (200)	.89 (200)	.87 (250)	.72 (450)	.81 (500)
Arithmetical Reasoning Test	.86 (200)	.88 (200)	.90 (250)	.82 (450)	.86 (500)
Mechanical Aptitude Test	.95 (200)	.95 (200)	.95 (200)	.88 (250)	.87 (500)
Mechanical Knowledge Test (Mechanical Score)	.90 (200)	.92 (200)	.91 (200)	.87 (250)	.86 (500)
Mechanical Knowledge Test (Electrical Score)	.84 (200)	.89 (200)	.82 (200)	.78 (250)	.83 (500)
Clerical Aptitude Test	.91 (780)†	.95 (400)†		.86 (400)	
Spelling Test	.85 (780)†	.91 (400)†		.73 (400)	
Radio Code Test	.88 (470)††				

\* Spearman-Brown Formula used to estimate reliability from odd-even test correlations except as noted.

\*\* Figures in parentheses represent the number of cases in the sample used.

† Reliability coefficients computed by Kuder-Richardson Formula #21.

†† Spearman-Brown Formula used to estimate reliability from correlation between Part I and Part II.

time limit and have recruits mark their papers to indicate progress. Then further time was allowed, and again the subjects were asked to stop and mark their papers. The third limit was arrived at by another extension of time. Scores on the first and second time limits were correlated with the maximal score obtained after the longest time limit was reached. The proportion of recruits completing each test or part test within the various time limits was also determined. Final time limits for each test were determined on the basis of the following criteria:

- the time limit with a high correlation of scores with those scores received under the maximum time limits,
- a time limit at which approximately fifty per cent of the subjects attempted all of the items,
- a time limit for which there was a well-balanced distribution of scores.

*Test Reliabilities.* Test reliabilities for Forms 1, 2, and 3 of the original five

<sup>6</sup> This section refers to the original five tests. Similar studies have been done for Form 1 of the Clerical Aptitude Test, Spelling Test, and Radio Code Test.



tests have been determined by the split-half method. Total scores for odd-numbered items and for even-numbered items on a test were correlated and the resulting coefficients of correlation corrected by the Spearman-Brown Prophecy Formula. Reliabilities for these tests, for the Clerical Aptitude Test and Spelling Test, and for all tests of the Fleet Edition have also been calculated by the Kuder-Richardson Formula #21. In each of the samples used in determining test reliability, the mean and standard deviation of the distribution approximated the corresponding figure for the national recruit population at the time. The reliabilities of the tests are shown in Tables III and IV.

TABLE IV

DATA ON TEST RELIABILITY OF THE BASIC TEST BATTERY (FLEET EDITION) BASED ON RECRUIT PERFORMANCE ON TESTS

Name of Test	Estimated Reliability	Correlation Coefficients between
	Coefficients Basic Test Battery (Fleet Edition) Form 1*	Tests of Form 1 of Basic Test Battery (Fleet Edition) and Com- parable Tests from Form 1 of Basic Test Battery
General Classification Test	.90 (500)**	.84 (500)
Arithmetical Reasoning Test	.77 (500)	.86 (500)
Mechanical Aptitude Test	.88 (500)	.74 (500)
Mechanical Knowledge Test	.87 (500)	.64 (500)
Electrical Knowledge Test	.79 (500)	.66 (500)
Clerical Aptitude Test	.96 (400)	.78 (400)

\* Reliability coefficients computed by Kuder-Richardson Formula #21.

\*\* Figures in parentheses represent number of cases in sample used.

*Development of Norms.* The norms on Form 1 of each of the original five tests were obtained from the scores made by a sample of the total recruit population. The sample from each Naval Training Station was chosen so as to be representative of its intake and proportional to its contribution to the total recruit intake. Norms for subsequent forms have been developed in a similar manner. In order that scores on all the tests might be comparable, the norms for all forms of all Navy tests have been established in terms of Navy Standard Scores with the mean on the test assigned a Navy Standard Score value of 50 and the standard deviation a value of 10.

*Test Scores in Relation to Age and Educational Level.* Table V shows the correlation coefficients between test scores and age and between test scores and highest school grade completed for a national sample of recruits in April 1944. It is interesting to note that the correlations between test scores and educational level are moderately high as might be expected, while, with two exceptions, the correlations between test scores and age are close to zero. It appears from the data in this table that as one gets older he may acquire a background of information relative to mechanical and electrical tools and processes more readily than he may improve in ability to read or to solve problems calling for arithmetical reasoning, or in mechanical or clerical aptitude.

*Intercorrelations and Factor Analyses.* Table VI presents the results of two intercorrelation studies. Data for the first of these studies, on Form 1, were obtained from a representative sample population of 500 recruits from all Naval Training Stations from July to October 1943. Data for the second study, on



Form 2, were collected from a sample of recruits from all Naval Training Stations in April 1944. The degree to which each sample studied was representative of the corresponding national recruit population is indicated by the following comparisons on the General Classification Test:

	<i>General Classification Test</i>		
	M	$\sigma$	N
<i>Form 1</i>			
Sample Population	47.50	10.21	500
Total Recruit Population	48.10	10.88	25,000
<i>Form 2</i>			
Sample Population	50.13	10.53	933
Total Recruit Population	50.07	10.55	81,898

Both the intercorrelation studies and the factor analyses reveal that all the tests have some elements in common. The intercorrelations, as can be noted in Table VI, range from .33 between the Mechanical Knowledge Test (Mechanical

TABLE V

CORRELATION COEFFICIENTS BETWEEN TEST SCORES AND AGE AND TEST SCORES AND SCHOOL GRADE COMPLETED, FOR BASIC TEST BATTERY: ALL TESTS

<i>Test</i>	<i>Correlation Coefficients</i>			
	<i>Test Score with Age</i>	<i>Test Score with Highest School Grade Completed</i>	M	$\sigma$
	(N = 906)	(N = 908)		
General Classification Test	.10	.65	50.1	10.6
Reading Test	.02	.58	51.0	11.7
Arithmetical Reasoning Test	.12	.57	50.0	11.6
Mechanical Aptitude Test	-.02	.52	50.4	10.3
Mechanical Knowledge Test (Mechanical Score)	.30	.39	52.1	11.2
Mechanical Knowledge Test (Electrical Score)	.19	.56	50.8	10.4
Clerical Aptitude Test	-.09	.65	50.3	9.2
Spelling Test	.06	.53	50.1	9.9
Radio Code Test	.05	.41	52.3	10.9
Age	—	-.02	26.1	6.7
Highest School Grade Completed	-.02	—	10.2	2.3

Score), Form 2 and the Spelling Test, Form 1, to .85 between Reading Test, Form 2, and General Classification Test, Form 2. The lowest group of intercorrelations are between the Mechanical Knowledge Test (Mechanical Score) on the one hand, and the Clerical Aptitude Test, Spelling Test, and Radio Code Test on the other.

Two factor analyses have been done on the tests of the Basic Test Battery, the first on the tests of Form 1, the second on Form 2 of the original tests plus Form 1 of Clerical Aptitude Test, Spelling Test, and Radio Code Test. The results of the second analysis will be summarized briefly.

Four factors were found. Factor A is a general intellectual factor, Factor B a specialized mechanical information factor, and Factors C and D are not clearly defined. Other



TABLE VI

INTERCORRELATIONS AMONG TESTS OF THE BASIC TEST BATTERY BASED ON DATA OBTAINED FROM ROUTINE ADMINISTRATION TO RECRUITS\*

Test	Variable	B	C	D	E	F	G	H	I	Navy Standard Score M	$\sigma$
General Classification											
Form 1	A	.81	.69	.60	.49	.53				47.50	10.21
Form 2		.85	.79	.69	.57	.73	.68	.68	.61	50.13	10.53
Reading											
Form 1	B		.69	.56	.46	.51				45.00	10.00
Form 2			.77	.67	.53	.68	.64	.63	.51	51.15	11.61
Arithmetical Reasoning											
Form 1	C			.61	.41	.47				45.00	9.95
Form 2				.69	.53	.68	.64	.58	.51	49.99	11.62
Mechanical Aptitude											
Form 1	D				.55	.53				48.00	10.31
Form 2					.61	.69	.65	.48	.49	50.51	10.28
Mechanical Knowledge (Mechanical)											
Form 1	E					.78				48.00	10.55
Form 2						.75	.36	.33	.34	52.32	11.19
Mechanical Knowledge (Electrical)											
Form 1	F						.55	.54	.45	48.00	9.47
Form 2										50.89	10.43
Clerical Aptitude											
Form 1	G							.66	.53	50.24	9.08
Spelling											
Form 1	H								.39	50.12	9.89
Radio Code											
Form 1	I									52.38	10.95

\* The data in light face are based on a sample of 500 persons for whom scores were obtained on Form 1 of General Classification Test, Reading Test, Arithmetical Reasoning Test, Mechanical Aptitude Test, Mechanical Knowledge Test (Mechanical Score), and Mechanical Knowledge Test (Electrical Score). The data in bold face are based on a sample of 933 persons for whom scores were obtained on Form 2 of the tests listed above plus Form 1 of Clerical Aptitude, Spelling, and Radio Code Tests.

factors may be measured by the tests, but with the restricted number of the tests in the battery they did not show up in this analysis.

The loadings of all tests on Factor A were .57 or higher. Its general structure is best



indicated by the fact that the General Classification Test, Reading Test, and Arithmetical Reasoning Test have very high loadings (.86 or higher) on Factor A and zero loadings (.11 or less) on Factors B, C, and D. In other words it appears that Factor A is a general intellectual factor. These high loadings are, in part, accounted for by the fact that Factor A is highly correlated with Factors B, C, and D, although the latter appear to be relatively independent of one another.

Factor B appears to be a specialized mechanical information factor. Both the Mechanical Knowledge Test (Mechanical Score) and the Mechanical Knowledge Test (Electrical Score) have high loadings (.50 or better) on Factor B and zero loadings (.11 or less) on Factors C and D.

Factors C and D are not clearly defined. Factor C might best be described by noting that the Mechanical Aptitude Test and the Radio Code Test have moderate loadings (.30 to .33) on it and zero loadings on Factors B and D. Parts One and Three (*Block Counting* and *Surface Development*) of the Mechanical Aptitude Test involve the ability to perceive visual relationships, while the Radio Code Test involves the ability to perceive auditory relationships. In terms of this evidence it might seem plausible to call Factor C "Speed in perceiving visual and auditory relationships." The Spelling Test is the only test having moderate loadings on Factor D and zero loadings on Factors B and C. The Clerical Aptitude Test has loadings of .30 on both Factors C and D.

From studies of validity of the tests of the Basic Test Battery for predicting the success of men in Naval Training Schools it is apparent that each test of the battery is of value in predicting success in some schools. For example, the Mechanical Knowledge Test (Electrical Score) is effective in selecting men for special training as Motor Machinist's Mate, the General Classification Test for selection for Signal Schools, the Mechanical Aptitude Test and Mechanical Knowledge Test (Mechanical Score) together for identifying those persons who can be most effectively trained as Machinist's Mates.

#### SUMMARY

The development of the Basic Test Battery has been among the major projects of the test development and personnel research program of the Bureau of Naval Personnel since early in 1943. Tests of the Basic Test Battery, Form 1, 2 or 3, have been administered to approximately two million recruits and other enlisted personnel. On the basis of comprehensive study of the tests of the battery a revision is in process. The first form of the Fleet Edition of the battery has been used with approximately 125,000 persons to provide data for use in classifying men for various types of duties aboard ship. Numerous requests have been received for copies of the Fleet Edition and additional forms are in process of preparation.

Since the first routine use of the tests, data have been regularly collected showing the relationship between test scores and various measures of success in enlisted training programs. More recently, studies have been instituted on the effectiveness of test scores in predicting success in naval duties aboard ship. Results of these studies on validity of the Basic Test Battery for selection and classification will be presented in a forthcoming article.



## PSYCHOLOGY AND THE WAR: NOTES

*Central Register for Reports in Military Psychology.* The Military Division of the APA is setting up a central register where members who wish to cooperate may file lists of unpublished manuscripts and reports in the field of military psychology, together with any special fields of experience. Such lists should be sent to the Secretary, *Commander William A. Hunt H(S) USNR, Neuropsychiatric Branch, Bureau of Medicine and Surgery, Navy Department, Washington 25, D.C.* It is requested that a list rather than actual manuscripts be sent to the Secretary, as the Division will not assume the responsibility for circulating unpublished material. Once the Military Division organizes this material, the Office of Psychological Personnel will serve as a permanent repository and make the file available for consultation. Anyone interested in specific items can then contact the psychologist concerned. While much has been published on the part psychology has played in the present war, many unpublished papers, official reports, etc. are not available in print and much that has not been put in reports, is locked in the personal memories of military psychologists. This new file will enable research workers and historians to consult material beyond that available in the literature.

*Predoctoral Fellowships in the Natural Sciences.* The National Research Council is ready to receive nominations and applications for the predoctoral fellowships in the natural (i.e. mathematical, physical, and biological) sciences which it administers under a Rockefeller Foundation grant. These fellowships are intended to assist young men and women, whose graduate study has been prevented or interrupted by the war, to complete work for the doctorate. It is hoped that they will accelerate the recovery of that scientific vigor and competence which is so seriously threatened by the loss of two graduate school generations of scientifically trained men and women. This program will be administered by a Committee on Predoctoral Fellowships of the NRC whose members are Henry A. Barton, Charles W. Bray, Detlev W. Bronk, Luther P. Eisenhart, Ross G. Harrison (Chairman NRC, ex officio), W. A. Noyes, Jr., and John T. Tate, chairman; Enid Hannaford, secretary.

The annual stipend will be \$1200.00 for single persons and \$1800.00 for married men. In general each recipient is expected to spend eleven months per year on academic work. An additional allowance up to \$500.00 per year will be made for tuition and fees. Fellowships granted to those eligible for educational support under the "G.I. Bill of Rights" will be at such stipends as to bring the total income from both up to that which would be received at the above rates. Before entering his graduate studies, each fellow will submit to the Committee on Predoctoral Fellowships a schedule, approved by his graduate school dean, for the completion of the work for the doctorate. On approval by the committee, this schedule will be the informal agreement upon which stipend payments will be based. At the university's discretion, the fellowship stipend may be supplemented by university grants. All such supplementary income should be recorded with the committee. The progress of fellows is subject to periodic review by the committee which reserves the right to cancel fellowships when satisfactory progress is not being maintained.

Prospective candidates for these fellowships should apply at once even though they may be unable to undertake their graduate study in the immediate future. Information concerning these fellowships and Nomination-Application blanks are being mailed out widely to graduate schools and wartime research laboratories. They may also be obtained by writing directly to the *Secretary, Committee on Predoctoral Fellowships, National Research Council, 2101 Constitution Avenue, Washington 25, D.C.*



## BOOK REVIEWS

HADAMARD, JACQUES. *The psychology of invention in the mathematical field*. Princeton: Princeton Univ. Press, 1945. Pp. xiii + 143.

Almost anyone who can write can write a book on psychology, especially in a field like invention, and Jacques Hadamard, distinguished French mathematician, professor emeritus of the *Collège de France* and the *École Polytechnique*, and recently visiting professor at Columbia, has the precedent of Poincaré, whom he follows in his conception of the problem and in his method. But in writing this small book Hadamard is not merely indulging a recently acquired avocational interest, like a retired admiral trying his hand at chicken farming. He has written and lectured on this topic previously, and has spent many scholarly hours reading and thinking about mathematical discoveries and debating the controversial issues with other mathematicians. The result is an enjoyable, minor essay on invention, from the inside, which anyone with an interest in this field ought to read.

The material from which Hadamard's essay is composed is introspective, in the tradition of Poincaré, consisting of reports from mathematicians who have significant inventions or discoveries to their credit. In considering the problem of whose creative processes are worthy of inquiry he criticizes an earlier investigator for trifling with "alleged mathematicians whose names are now completely unknown" and even states that the "laws of tense thought may be and seem to be very different from those of usual and common ideation, which is the only frequent one among ordinary people." These reports from the author and other extraordinary people yield an acquaintance with their work methods and at least one fairly definite generalization, namely, that most of these mathematicians are not aware of imagery of words, at least not in the initial "combinatory play," as Professor Einstein calls it in his letter to the author. Instead they report kinetic imagery and imagery of points, masses and schemes, this imagery functioning, as Poincaré phrased it, "in order that useful hookings, once obtained, may not get lost."

Such testimonials from big-name mathematicians give the reader the feeling that he is coming closer to the process of invention, and those concerned with imagery are valid enough, almost by definition. But the introspective method is a notoriously misleading one for attacking problems such as the function of images, sources of ideas and necessary conditions for thought, or questions like No. 7 in the questionnaire printed as Appendix I: "What, in your estimation, is the role played by chance or inspiration in mathematical discoveries? Is this role always as great as it appears to be?" It is in answering queries of this sort that one's intellectual predispositions are practically insurmountable. No mathematician, at least none who has lived in our culture longer than Joel Kupperman, approaches this question with an open mind.

Among psychologists Hadamard will be criticized for his treatment of the unconscious and the motivation of invention. In his chapter on unconsciousness he draws attention to automatic writing, sudden and unexplained illuminations, shifts in the focus of attention and other mysterious subjective phenomena, then, in the next chapter, asserts that it is this unconscious, whose existence he has established, which has the critical function of sorting out the useful combinations of ideas from the useless. For "consciousness," he says, in a sentence which is either a slip of an otherwise careful pen or an illustration of the extreme ambiguity of the word, "only knows of the right ones." Hadamard's reluctance to treat the more intimate psychological events on a naturalistic plane is epitomized in his curious distinction, on page 20, between two kinds of chance:



psychological chance, consisting of fortuitous mental processes acting inside unconsciousness, and *external* hazards.

In Hadamard's analysis of invention a major part is played by the "sense of beauty," meaning beauty of a scientific or intellectual sort. This concept, though hard to define, is explicitly defended and is, in fact, offered as the guide to the unconscious in its choice of ideas and as the drive for discovery. "It seldom happens that important mathematical researches are *directly* undertaken in view of a given practical use: they are inspired by the desire which is the common motive of every scientific work, the desire to know and understand." The argument for this one-sided explanation, in the final chapter on *The General Direction of Research*, is a *non sequitur*: Since most mathematical research is not applied research, it must be driven by a sense of beauty. Desires for attracting attention, doing something different, founding a school, professional advancement, and other less noble impulses, which Hamadard will admit may motivate literary and artistic production, do not achieve results in mathematics, certainly not good results.

It seems to the reviewer that Hadamard has carried the testimonial method of research about as far as it will go. He has collected a fascinating variety of continental lore and anecdotes about scientific invention. He is aware of the importance of individual differences, and even has a chapter on *Different Kinds of Mathematical Minds*. Working with this material he has pondered carefully, from an inside position, over the important aspects of the problem. Although some may quarrel with his final stand at several points, it is hardly fair to criticize the lack of objectivity in a work of this kind when there is little objective evidence available on the problem in the form in which he has set it up.

University of Illinois.

DONALD M. JOHNSON.

FARBER, MARVIN. *The foundation of phenomenology*. Cambridge, Mass.: Harvard Univ. Press, 1943. Pp. xi+585.

The content of this book is clearly indicated by its sub-title: *Edmund Husserl and the Quest for a Rigorous Science of Philosophy*. It is the third in a planned series of publications of the International Phenomenological Society. The author, who studied under Husserl in the course of his graduate work in Germany, gives a comprehensive, critical survey of the latter's thought. A large part of the book is devoted to Husserl's most famous work, the *Logische Untersuchungen*. This has been done, the author tells us in his preface, in fulfillment of a promise made to Husserl.

Husserl is coming to be widely recognized as a highly original thinker who initiated a new descriptive method in philosophy which opens up extensive possibilities. Just how extensive the possibilities of phenomenology are it remains for the application and the criticism of Husserl's followers to show. Professor Farber takes up the products of his thought mainly in chronological order. He distinguishes several stages in Husserl's development as a thinker. These stages, he finds, may be reduced to three periods, characterized as (1) psychologism, (2) simple descriptive phenomenology, (3) transcendental phenomenology. The first period is one in which Husserl tries to establish a psychological foundation for logic and mathematics. In turning against psychologism later, Husserl did not, of course, turn against psychology. Throughout his career he held a



very favorable attitude toward psychology and did much to forward its development. The second period of Husserl's thought is characterized by the attempt to develop a method free from the assumptions of psychology and metaphysics, and thus to make phenomenology, now established as an autonomous discipline, the most rigorous of the sciences. This last claim is supported by the belief that phenomenology is founded upon pure experience, free from presuppositions. In the third period Husserl maintains that the proper approach to philosophy is through what he calls the phenomenological reduction, the suppression of all assumptions. Phenomenology is now defined as the science of transcendental consciousness, and as such it differs widely in method from psychology.

To the psychologist, Professor Farber's book is interesting primarily from a historical and systematic point of view. Husserl was a pupil of Brentano, and his development of the act psychology of his teacher had an important influence upon some of the leading psychologists of his day—notably Stumpf, to whom the *Logische Untersuchungen* is dedicated, and Külpe. His phenomenology helped, more or less directly, to pave the way for the appearance of Gestalt psychology. Husserl came to make a sharp distinction between phenomenology and descriptive psychology, which in his early thought he had considered identical. His emphasis upon phenomena, however, had its effect upon the thinking of contemporary psychologists at both stages.

Professor Farber remarks that "Husserl has been one of the most misunderstood men in the history of philosophy" (p. 544). This is doubtless due in no small measure to the originality of this thought. Professor Farber's book should go a long way toward clearing up misunderstandings on the part of contemporary students. The author wisely points out that "an extensive literature is necessary for the assimilation of Husserl's contributions . . ." (p. 5). Other works are projected or in preparation. The volume under consideration is timely for the psychologist as well as for the philosopher. In spite of the practical emphases imposed by the times, there are evidences that psychologists are carefully examining the presuppositions of their science and its relation to other intellectual undertakings. When such questions arise the study of a discipline which consistently endeavors to free itself from all presuppositions cannot fail to be enlightening.

The author's style is clear, but by no means simple, as, of course, it cannot be, given the subject with which he deals. Admirable too are the cooperative spirit in which he approaches broader problems and his open-mindedness. Although Professor Farber says that Husserl remains one of the great influences upon his own development, he does not by any means follow his master in strict "orthodoxy." He is keenly critical of a number of points of view which developed in Husserl's transcendental idealism. He points out, for example, that Husserl sometimes fails to "acknowledge the assumptive nature of the general field of subjectivity" (p. 541). He then goes on to remark, "Subjectivity cannot be said to have a being of its own, independently of the natural conditions of existence. It, too, has a locus in the physical world, if by being *actual existence* in the natural sense is meant. It can—and must for philosophical purposes—however, be *treated* as autonomous, as disengaged from its natural setting" (p. 542). Such an interpretation of subjectivity cannot but recommend the author favorably to the majority of contemporary psychologists.

JOHN T. METCALF.



SEWNY, VAHAN D. *The social theory of James Mark Baldwin*. New York: King's Crown Press, 1945. Pp. vi+93.

As James Mark Baldwin is considered as one of the American founders of both psychology and sociology, his formulations in the field of social phenomena deserve at least a general review. To Baldwin, the study of the self is basic to the study of societal processes, and the self is best to be studied as it develops in children from a simple discrimination between persons and inanimate objects to an appreciation that others have the same sorts of experiences as the person himself. Social imitation, as an innate impulse, lies at the root of all socialization, with "invention" as a concomitant variant response to learned social behavior. Play aids socialization by providing for "a sort of artificial recapitulation of the . . . exertions of race progress." The main stages in social organization are (1) the instinctive, (2) the spontaneously learned, and (3) the reflective, where behavior is guided by "intelligent judgment." As society passes through these stages, it becomes less dependent on inherited and more on learned social behavior patterns. To Baldwin, the social self is essentially an *ethical* self, with the "average man" defined as "a person who learns to judge by the judgments of society." The school, the state and the church are institutions requisite in every society, to serve its "cultural," "regulative," and "sentimental" interests. Evolution in human society is based on accommodation to environment and social transmission of the resulting learned methods. Knowledge passes through the *prelogical* (theological) and the *logical* (scientific) to the *hyper-logical* (aesthetic) stage.

From our present day point of view, Baldwin's approach may best be characterized as social-evolutionistic, Hegelian-idealistic, and verbal-theoristic. At best many of his formulations are capable of suggesting hypotheses which are potentially precisely formulable. At worst, his "verbal" approach is confusing and principally lacking in those precise formulations which ultimately are the only adequate basis for science in any field. Historically, Baldwin's approach must be evaluated coordinate with Cooley's as an important and valuable contribution to the foundation of sociology and social psychology as empirical sciences.

State University of Iowa.

R. B. AMMONS.

RICHMOND, WINIFRED V. *Making the most of your personality*. New York: Farrar and Rinehart, 1942. Pp. vi+247.

This book was written by a psychologist who assures her readers that it is a book for adolescents which contains what young people themselves want to know, a claim based upon the submission of the manuscript to 28 high school boys and girls for criticisms and suggestions.

There is no legitimate objection to the book's contents: in fact, everything said is so obvious and has been repeated so often that the book is not justified on informational grounds. Its chance to become a real contribution lay in a fresh approach, cleverly devised to attract and hold the elusive attention of the adolescent. In this, she both succeeds and fails: when she is concrete and specific, she succeeds; when she generalizes and preaches, she fails. In the sections where there is a real attempt to elaborate the theme implied by the title (Chapters VI, VII, VIII, IX), the book provides interesting and purposeful reading, with a novel game-like flavor.

One suspects another veiled attempt at sex education camouflaged from the



unsuspecting by a popular and misleading title. The writer's confidential approach gives the impression that she is letting the readers in on a secret and will tell all, which, in fact, she does. The section on *The Sex Side of Life* is so frank and detailed compared with the other chapters that if the book were to be made available to adolescents in general, the pages of this chapter would probably become worn with use, while the other chapters remained untouched and unseen.

Inconsistency in the use of terms is evident throughout, particularly with regard to the word "childish." "Childish" exuberance is complimentary, but it is also "childish" to be selfish, impatient, to gossip, to be a homosexual, to have a temper tantrum, to be a sex pervert, or to behave in certain ways when senile. The author seems aware in this repetitious usage that the label of "childish" is effective in stigmatizing anything for an adolescent, but its effectiveness is lost through indiscriminate use.

The concluding chapter, *All Sorts of People*, is irrelevant and redundant. It adds the final touch to the book's message which seems to be that life is complex, particularly in its emotional aspects, and that any teen-ager who will be able to unravel its maze of complexes, yearnings, suspicions and dreams, will be fortunate (and rare) indeed.

The book describes the adolescent for the adolescent's parent better than for the adolescent himself. Many of the admonitions and emphases depend upon an experiential background not possessed by teen age children. Adolescent psychology is presented more as a threat to personality than as a transition stage in the growth process. The book's appeal could have been increased by a point of view which harbored a healthy respect for personality hazards, but which also got across to the boy or girl the many advantages and privileges of adolescence.

ELIZABETH MECHEM FULLER.

*University of Minnesota.*

ROBACK, A. A. *A Dictionary of International Slurs* (Ethnophaulisms). Cambridge, Mass.: Sci-Art Publishers, 1944. Pp. 394.

Dr. Roback has begun the intriguing task of a systematic survey of name-calling between the nations. In a 100 page literary essay, he then rushes into an interpretation of "ethnic prejudice" and comes out with a moving appeal for reform and enlightenment. Between the nasty slur and the aspiring slogan, he draws but one strong thread, the persistence of anti-semitism. He has utilized his original researches into Jewish literature and folklore.

He lists slur expressions and derogatory proverbs, about 3000 in all; these are organized sometimes according to the language source and to the group criticized, and sometimes merely alphabetically. His sources are 12 English compilations of slang and cant, 82 foreign dictionaries, and 30 books cataloguing the proverbs of nations and folks. The erudition is almost flagrant; yet several cases of historic-linguistic correlation through which we come to understand the rise of particular epithets serve to point up possibilities in this philological approach to prejudice and folklore. Naturally the English sections are far more complete; yet even in the foreign jargon data listed we gain insight into the particular attitudes within special group interactions: rivalries, recriminative insults (e.g. blame for the spread of syphilis), scapegoating against a group (as against the Negroes) or within a nation (such as one class of Jew against another), and forced tolerance (legislation against slandering groups).

We find historic roots for the Nazi paranoiac outbreak in a 17th century



German proverb expressing a sense of oppressed isolationism (213); and there are corresponding warnings against the Germans in long-standing proverbs from Austrians, Czechs, Danes, Hungarians, Italians, Poles, Russians, Swedes, and Swiss, e.g., "When a snake warms himself on ice, a German will begin to wish well a Czech;" and, "Wherever Germans are, it is unhealthy for Italians" (168).

The proverbs are generally a safer source than slurs, since contexts and usage are less ambiguous, and, as witticisms, they may represent a more consolidated antagonism and argument. Philologically, the slurs are richer in their subtle reflections of feeling tones and of language process. However, the task is enormous, full of the most serious obstacles in interpreting semantic and emotive significances and sources. Surely one man of one culture will be unable to do justice to the colloquialism of 50 other groups. The inevitable consequence here is a very uneven treatment of his raw data; they remain largely superficial and unanalyzed. Though dealing so directly with national differences and stereotypes there is no mention of Klineberg or Lippman! The name of psychoanalysis is called in vain (248); for the "id" character of prejudice (249) is never demonstrated nor its primary processes applied, and the superiority of "ego training" (342) over education is never explained. Dr. Roback's essay is "psychologistic" and literary but only incipiently analytic.

*New School for Social Research.*

JOEL SHOR.



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## NOTES AND NEWS

JOHN J. B. MORGAN, professor of psychology, Northwestern University, died August 16, at the age of fifty-six years. Dr. Morgan received his Ph.D. from Columbia in 1916 and was an instructor in psychology, Princeton University, in 1917. During World War I, he was chief psychological examiner at Camp Hancock, with the rank of Captain. He served as assistant professor of psychology, University of Minnesota, 1919-20 and as assistant professor and director of the psychological clinic, the State University of Iowa, from 1921 to 1924. In 1925 he became assistant professor at Northwestern, in 1927 associate professor, and in 1933 professor of psychology. Dr. Morgan was a widely recognized authority on child psychology and on abnormal psychology and was the author of many articles and texts. He became a member of the Association in 1916.

WINIFRED V. RICHMOND, psychologist, State Department of Public Welfare, Santa Fe, New Mexico, died on July 5, 1945.

The honorary doctorate of laws was conferred June 23 by the University of California on LEWIS M. TERMAN of Stanford University. On June 28, at Harvard University, his son, FREDERICK E. TERMAN, director of the radio research laboratory at Stanford, was awarded the honorary doctorate of science.

GEORGE R. BACH, formerly instructor in psychology at Western Reserve University, has been appointed professor of psychology at Kent (Ohio) State University.

J. S. A. BOIS, Lieut. Colonel in charge of the Research and Information Section, Adjutant General's Branch, N.D.H.Q. (Ottawa, Ont.), has been released from the Army and has taken the position of senior staff psychologist with Stevenson and Kellogg, Ltd., Management Engineers in Montreal.

CHARLES W. BRAY and HADLEY CANTRIL, associate professors of psychology at Princeton University, have been advanced to professorships, and LEO P. CRESPI, instructor in psychology, has been advanced to an assistant professorship.

WALLACE CRAIG, research fellow in psychology at Harvard University has received a grant of \$1,250 from the Penrose Fund of the American Philosophical Society for a study of "The space system of the perceiving self."

MAJOR KARL M. DALLENBACH, of the U. S. Army, on leave from the professorship of psychology at Cornell University, will become Susan Linn Sage professor of psychology on his return from military service. This professorship was established in 1885 as a gift from Henry W. Sage.

The following promotions were announced recently by the University of Pittsburgh: to associate professorships in psychology, ALFRED G. DIETZE and WILLIAM R. GROVE, the latter to be in charge of the psychological clinic and veterans' counseling service; and to an instructorship in psychology, ERMA T. WHEELER.

WILMA T. DONAHUE has been appointed director of the Michigan Psychological Services of the Institute for Human Adjustment at the University of Michigan. Michigan Psychological Services is a facility for extending the uni-



versity's program in research, the training of professional workers and service in the field of clinical psychology.

WILLIAM E. HALL, assistant professor of psychology, Eastern Washington College of Education (Cheney), has a year's leave of absence to serve as associate professor of psychology at the University of Nebraska.

The degree of doctor of science was conferred on DONCASTER G. HUMM on June 23 by Bucknell University in recognition of his work on "The standardization and validation of the Humm-Wadsworth Temperament Scale and its application to over three million industrial workers."

HERBERT H. HUMPHREYS, formerly assistant professor of psychology, Michigan State College, has accepted a position as assistant professor of psychology at the University of Kentucky.

HUDSON JOST, who has been research associate in psychophysiology at the Mooseheart Laboratory for Child Research at Mooseheart, Illinois, has been appointed assistant professor, department of neurology and psychiatry, and director of the psychophysiological laboratory of the Medical School, University of Tennessee, Memphis.

BRUNO KLOPFER will join the staff of the City College of New York as associate professor in the Fall of 1945. A program of graduate courses in the Rorschach method and other projective techniques to be given by Dr. Klopfer and his associates is being instituted in the graduate department of psychology at the City College.

MABEL F. MARTIN joined the staff of the Wichita Guidance Center August 1 as consulting psychologist, and FRANCENA L. PEARSON from the University of Iowa was appointed to a psychological examiner internship at the Center.

FANNIE D. MONTALTO has been appointed assistant clinical psychologist in the department of psychiatry, College of Medicine of the University of Cincinnati and in the Central Clinic of the Cincinnati General Hospital.

L. A. PENNINGTON has been released from active duty by the Navy and has returned to his position at the University of Illinois.

MALCOLM G. PRESTON of the department of psychology, University of Pennsylvania, has been appointed to the staff of the School of Social Work of the University of Pennsylvania which has recently become one of the coordinating professional schools of the University.

WILBERT SCOTT RAY, chairman of the department of psychology, Adelphi College (Garden City, N. Y.) is serving in one of the European school centers for American servicemen.

BRITTEN L. RIKER has been appointed assistant professor of psychology at the University of Vermont.

MERRILL ROFF, Major AC, Hq. AAF, who has been released from the Army returns to his position in the department of psychology, Indiana University, Bloomington, Ind.

JOHN P. SEWARD has resigned his position at Connecticut College and has accepted an associate professorship in psychology at the College of Liberal Arts, Boston University.



GEORGENE H. SEWARD has resigned her position at Connecticut College and has joined the faculty of Simmons College, Boston.

GEORGE D. SMALL, dean of men, Kansas State Teachers College (Pittsburgh), has been appointed dean of men and instructor in psychology, University of Tulsa.

DONALD W. TAYLOR of the Radio Research Laboratory, Harvard University, has been appointed acting assistant professor of psychology and Thomas Welton Stanford Fellow at Stanford University. War conditions permitting, he will assume his duties at Stanford in January, 1946.

HOMER E. WEAVER, assistant professor of psychology, Oberlin College (Oberlin, Ohio), has been advanced to an associate professorship.

M. A. WENGER, Lt. (jg.), USMS TS, has been appointed assistant professor of psychology at the University of California, Los Angeles.

S. MEDFORD WESLEY has been appointed to take charge of the psycho-educational clinic at the University of Southern California.

The Hennepin County Welfare Board, Minneapolis, Minn., has started operating the Vince A. Day Center, a home for children in which children will be placed temporarily for study and treatment before permanent placement. VIRGINIA H. BIXLER, of the Council of Social Agencies is superintendent, CHARLOTTE PHILLEO, formerly psychologist with the Division of Public Instruction of the State of Minnesota, is assistant superintendent, and AUDREY R. ARKOLA is girls' counselor.

The Metropolitan Life Insurance Company has published a booklet *Coming Home*, intended for the families and friends of returning servicemen. This pamphlet was prepared by the Company with the cooperation of the OWI and utilizes the information and experience of the Army Air Forces Convalescent-Rehabilitation program. Copies may be obtained free of charge from the Metropolitan Life Insurance Company, One Madison Avenue, New York City.

The publication, *Jobs for G.I. Joe in America's Hotels*, published by the Veterans Employment Program of the American Hotel Association, 221 West 57th Street, New York 19, N. Y., is a description of the physical demands of jobs within the hotel industry, and will probably be useful as a reference manual to rehabilitation counselors, who can obtain copies through the American Hotel Association.

The AC Spark Plug Division of General Motors Corporation, Flint, Mich., has published a booklet entitled *The Use of Tests in Proving Personnel Procedures*, by ORLO L. CRISSY, industrial psychologist and educational director, which gives brief descriptions of some of the selection procedures used in that division and validations with supervisors' ratings.

*Southern California Psychological Association.* A regional psychological association has been organized in Southern California to be known as the Southern California Psychological Association. The following are the officers of the new association: *President*, ROY M. DORCUS, *Vice-President*, FLOYD L. RUCH, *Secretary-Treasurer*, GILBERT BRIGHOUSE, *Directors*, HILDING B. CARLSON, HARRY W. CASE, JOSEPH W. HAWTHORNE, LOUIS P. THORPE, LEE EDWARD TRAVIS and DONALD P. WILSON.



*Officers of the IAAP.* The new officers of the Illinois Association for Applied Psychology are: *President*, PHYLLIS WITTMAN, chief psychologist of the Mental Hygiene Division of the Department of Public Welfare of the State of Illinois; *Vice President*, FRANCIS W. HIBLER, supervisor of Industrial Psychological Services of Stevenson, Jordan and Harrison, Inc.; *Secretary*, MILTON A. SAFFIR, psychologist of the Bureau of Child Study and director of the Psychological Guidance Center in Chicago; *Treasurer*, STANLEY S. MARZOLF, associate professor of psychology at Illinois State Normal University; *Members-At-Large of the Executive Committee*, ADAM R. GILLILAND, professor of psychology at Northwestern University; HELEN SCHACTER, chief psychologist of the Veterans' Rehabilitation Center in Chicago, and HAROLD C. TAYLOR, employment manager of the Western Electric Company.

*M.S. in Clinical Psychology at Illinois.* The Board of Trustees of the University of Illinois on March 13, 1945, approved the recommendation of the University Senate, that the degree of Master of Science in Clinical Psychology be established to be conferred upon students meeting the following requirements: (a) Completion of undergraduate work sufficient to qualify for full graduate standing in psychology. This work shall include at least one course each in statistics, child psychology, and clinical psychology, and a total of not less than sixteen hours of psychology. (b) Completion of eight units of graduate work, with not less than four units in psychology, and not less than two units to be chosen from education and sociology (or other department upon recommendation of the department of psychology and the approval of the Dean of the Graduate School). (c) Completion of an internship consisting of six calendar months of supervised clinical experience at the Institute for Juvenile Research (or other institution, agency, or department, upon recommendation by the department of psychology and the approval of the Dean of the Graduate School).

*Research in the Psychological Corporation.* At the April meeting of the Board of Directors of the Psychological Corporation a new plan was adopted for the promotion of research in the Corporation and thus for the furtherance of the Corporation's basic aim, *The advancement of psychology and the promotion of its useful applications.* Each of the Corporation's five Divisions will set aside in each four-month fiscal period such a sum for research as is justified by the net income of the Division in the preceding fiscal period. The researches will be planned and controlled by the Directors of the Divisions, separately, or in co-operation, or in consultation with the General Manager or the Committee on Research, or perhaps at times by specially appointed research associates. The Committee on Research will be available for consultation, and will receive at the end of each fiscal period reports from the Divisions on the research accomplished and the money expended for it. This Committee consists, in its initial appointments, of J. G. JENKINS, R. S. WOODWORTH, and D. B. LUCAS. Research projects in the Corporation can also be supported from the general funds of the Corporation.

*Correction:* In the article by WM. D. ALTUS, "The Adjustment of Army Illiterates," pp. 461-76, July issue of the *Psychological Bulletin*, there are two errors as follows: p. 467, 1st line, 2nd paragraph, "tetrachoric correlation is .52," should be "tetrachoric correlation is .54; p. 471, 4th line, 3rd paragraph, "items 5, 6," should be "items 4, 5."



# Psychological Bulletin

## PSYCHOLOGICAL CHANGES IN ORGANIC BRAIN LESIONS AND ABLATIONS\*

SEYMOUR G. KLEBANOFF

### I. INTRODUCTION

The general symptoms occurring in conditions of organic brain disease and those which may be considered to be of diagnostic and localizing value appear to fall into two basic categories. On the one hand, there are the various clinical neurological signs which manifest themselves in the forms of certain paralyses, anaesthesias, irregular or abnormal reflex activity, choked discs, visual field defects, positive serological findings, and numerous other observable signs. These signs have long served as the fundamental criteria in the diagnosis and localization of brain disease within the limits of the present status of knowledge of cortical localization of motor and sensory function.

On the other hand, increasingly greater attention has been given to certain mental or psychological alterations which occur in cases of organic brain disease. One need only reflect upon the variety and the severity of the mental changes seen in luetic invasion of the central nervous system to be aware of the existence of some relationship between structural damage and impaired psychological functioning. The disturbances of mental functioning observed in patients with cerebral arteriosclerosis offer further evidence for the presumable existence of a relationship between brain structure and mental function. The potential value of the psychological changes occurring in organic brain disease in supplementing clinical neurological findings for purposes of diagnosis and perhaps localization would seem considerable. Such mental manifestations appear to warrant concerted exploration and investigation by means of objective and systematic psychological approaches. Mere symptomatic description of a qualitative nature does not seem to suffice as a methodology to permit subsequent generalization. The development in this field in recent years indicates that the test techniques of clinical psychology may be of considerable value in bringing greater accuracy as well as the necessary organization in such investigations.

The main objective of the present review is to present systematically the studies of the mental disturbances associated with brain disorders in which psychological test techniques have been utilized which have appeared in the literature up to the present time (1941). Such a systematic review seems indicated at this time in the light of the discordant findings and procedures in this area. Studies will be examined with the hope of discovering certain common weaknesses which might account for the lack of system and the inability to evolve any generally accepted conclusions. Further, a review may serve to

\* From the Research Service of the Worcester State Hospital, Worcester, Mass. The writer is indebted to Dr. David Shakow for valuable suggestions and criticism.



orient more adequately future studies of the psychological changes in brain disease with regard to procedures and methodology.

Qualitative or clinico-descriptive reports of mental alterations accompanying organic cortical involvement comprise the greater portion of the work in the field. These consist essentially of descriptions of the mental deficits occurring with tumors, traumatic lesions, or ablation of cortical tissue in specific areas of the brain. Although chronologically, this is the primary method of study of the psychological symptomatology, the present review will be concerned mainly with those studies employing psychological test devices or techniques in the measurement of the mental manifestations. However, the fundamental value of the qualitative or descriptive reports should not be minimized. Such observations must inevitably be basic to subsequent attempts to apply more accurate, objective, and specialized psychological techniques to the measurement of the mental manifestations.

## II. QUALITATIVE STUDIES OF THE PSYCHOLOGICAL CHANGES IN ORGANIC BRAIN DISORDERS

From the qualitative studies dealing with the mental symptomatology of organic brain disease it is actually possible to list the frequency of the reported occurrence of certain mental symptoms and thus make a profitable first step toward applying more accurate and standardized methods of measurement to the psychological changes which occur. The psychologist faces the task of applying and developing objective and perhaps standardized test techniques for the systematic and accurate measurement of the presence and degree of the qualitatively noted mental symptoms. When and if this is done, the burden placed upon clinical impression with its subjective errors will be lessened. While the basic purpose of this paper is to review the beginnings made in this direction, a better perspective can be obtained by first considering the more salient conclusions to be drawn from the qualitative studies.

The mental changes observed in patients with brain disease must be evaluated from two points of view:

1. The cortical location of the lesion in order to note whether any specific cortical areas are of localizing value with reference to mental changes.
2. The nature of the brain damage, and particularly, the possible differences to be found in the presence of diseased tissue such as tumors or other disturbances, or in the absence of brain tissue such as occurs in cases of surgical ablation.

Only a cursory glance at the literature is necessary to demonstrate the importance of the anterior regions of the cortex with reference to mental symptoms. More precisely, the frontal and temporal regions seem primarily and most frequently involved. The parietal regions play a less dominant role and disease of the occipital area does not appear to give rise to significant mental manifestations.

### A. The Frontal Cortex

Traditionally, damage to the frontal lobes has been believed to produce the most marked disturbances of behavior in the psychological sphere. The evolution of this view apparently dates back to the year 1848 when Phineas Gage, a laborer in a small town in Vermont had an iron crowbar driven through the frontal region of the brain in an accident. Although both frontal lobes were destroyed, he survived for twelve years following the accident. Anecdotal data inform us of striking psychological changes in him. Previous to the accident,



he had been an efficient workman, but following the injury he showed a general personality deterioration with emotional decay, loss of finer feelings, immorality, childishness, and irresponsibility so that he was no longer able to hold his former position of teamster. However, it is stated that no observable impairment in the intellectual sphere resulted. Obviously, the absence of any test devices along with the possible low initial level of the patient render this latter observation open to question.

The facts of comparative neuro-anatomy indicate that the frontal cortex attains maximum structural development in man and phylogenetically is the most recent cortical acquisition. It has long been termed man's most vital possession and the highest intellectual and moral functions have been assigned to it. Following is an organized summary of the disturbances of functions which have been observed qualitatively in specific lesions in this region of the human cortex.

1. *Traumatic Lesions:* Studies of the mental effects following traumatic lesions in the frontal lobes indicate that a certain group of changes appear with

TABLE I  
FRONTAL LESIONS DUE TO TRAUMA

<i>Author</i>	<i>Year</i>	<i>No. Cases</i>	<i>General Intellectual Deterioration</i>	<i>Euphoria Hyperactivity</i>	<i>Personality Alteration</i>	<i>Loss of Initiative</i>	<i>Depression Retardation</i>	<i>Memory Loss</i>	<i>Attention Defect</i>	<i>Impairment of Abstraction</i>
Fritsch & Hitzig	1870	25	x						x	x
Ferrier	1886	57							x	
Bianchi	1894	—*			x					
Bolton	1902	—	x					x	x	x
Franz	1907	—	x							
Foerster	1918	—	x		x	x				
Isserlin	1918	—	x		x					
Poppelreuter	1918	—	x					x	x	
Donath	1923	—	x	x		x	x	x		
Feuchtwanger	1923	—		x	x		x			
Wimmer	1923	3						x		
Goldstein	1923	—		x		x			x	x
Sachs	1925	25				x				
Marcus	1926	7		x				x		
Holmes	1927	—		x	x		x			
Khoroshko	1929	5		x		x	x			
Kleist	1930	—		x	x		x			
Claude	1931	—								x
Grünthal	1936	17	x		x	x				x
Ruffin	1939	—	x	x		x	x			
TOTALS:			9	8	7	7	6	6	5	5

\* Where the number of cases is not given, this either was not reported by the author or could not be obtained from an abstract of the original paper.



marked consistency. The frequency with which certain of the mental symptoms have been reported in the literature has been tabulated in an effort to determine whether a frontal lobe mental syndrome appears. These findings for traumatic lesions in the frontal region are summarized in Table I.

A group of difficulties most frequently referred to as "distractibility of attention" occurs with significant frequency in frontal lobe lesions. Fritsch and Hitzig (35) reported such a defect as early as 1870 in a study of 25 cases. Ferrier (25) found this to be a very common symptom in 57 cases which he carefully studied and later Bolton (9), Poppelreuter (106), and Goldstein (41) emphasized an inability to sustain attention in such cases.

Loss of initiative, lack of spontaneity, or apathy were first emphasized by Foerster (27) in 1918 when he had an opportunity to study numerous cases of war injury to the frontal region. Donath (22), Sachs (116), and Khoroshko (75) report these to be predominant mental changes and Goldstein (43), Ruffin (113), and Grünthal (48) observed these with marked frequency.

Personality alterations were first systematically noted by Bianchi (6) in 1894. Feuchtwanger (26), Holmes (63), Foerster (27), Isserlin (67), and Grünthal (48) have all emphasized the occurrence of general character changes in patients with frontal lobe lesions. Kleist (76) draws attention to the similarity of the personality changes in frontal lobe disease and general paresis.

"General intellectual deterioration" was the predominant change noted in the cases studied by Isserlin (67), Donath (22), and Foerster (27). This general defect is also reported by Fritsch and Hitzig (35), Bolton (9), Franz (29), Poppelreuter (106), Grünthal (48) and Ruffin (113). Opposed to these observations are those of Wimmer (137) and Feuchtwanger (26) who state that there is no detectable intellectual deficit in cases of frontal lobe lesions. They find the basic mental change to be affective rather than intellectual.

However, as early as 1870, Fritsch and Hitzig (35) reported an observable deficit in a specific aspect of the intellectual process. They noted a definite impairment of abstract thinking in a majority of 25 cases studied. Bolton (9) reported this symptom in 1902 and later Goldstein (42), Claude (15), and Grünthal (48) placed great emphasis upon this impairment. The subsequent work of Goldstein with reference to the more adequate detection of this defect arises out of these earlier observations and will be considered in greater detail in a later section.

Alterations in general psychomotor tempo and mood tone are perhaps the most frequently noted mental changes in all the cases studied. These changes appear capable of occurring either in the form of euphoria with hyperactivity and irritability or in the form of depression with general psychomotor retardation and dullness. Alterations in both directions have been observed by Feuchtwanger (26), Donath (22), Holmes (63), Khoroshko (75), Kleist (76), and Ruffin (113). Goldstein (41) and Marcus (85) observe the dominant picture to be one of euphoria or "Witzelsucht" with little mention of depression or retardation.

Other mental symptoms have been reported with lesions of the frontal region, but they have been reported with far less frequency than those mentioned above. Donath (22), Sachs (115), Wimmer (137), and Marcus (85) have all observed an impairment in recent memory functioning. On the other hand, Goldstein (41) and Grünthal (48) have failed to note the existence of any memory defect whatever. Bolton (9), Donath (22), and Poppelreuter (106) believe the memory defect to be a generalized one affecting both recent and remote memory functions. Sachs (115), however, finds that memory for remote events remains intact, but that recent memory function is markedly impaired. The confusion and disagreement with reference to the existence and nature of the memory loss can probably be attributed to the absence of any test techniques for its more



objective evaluation. Qualitative observation can scarcely suffice to detect impairment of this function in many cases.

2. *Frontal Lobe Tumor*: A review of the psychological changes occurring in cases of tumor of the frontal region reveals essentially the same picture as is found in cases of traumatic lesion. This may be seen by referring to Table II. However, there do appear to be some instances of displacement of emphasis.

The most frequently observed symptom in tumors is a euphoria with motor restlessness and irritability. This was first noted by Jastrowitz (68) in 1888 and by Oppenheim (100) in 1889. This symptom was later especially emphasized by Baruk (3), Moersch (91), Holmes (62), and Frazier (32) and was also frequently observed in studies by Lloyd (84), Dercum (20), Pfeifer (103), Nonne (96), Kennedy (71), Minski (89), Hyland and Botterell (66), and Shamboorov (122). Mood changes tending toward depression with psychomotor retardation is reported less frequently in cases of frontal tumor. However, Jastrowitz (68), Williamson (136), Lloyd (84), Moersch (91), Holmes (62), Kennedy (71), Shamboorov (122), and Hyland and Botterell (66) did note such a change, but somewhat less frequently than the euphoric type of reaction.

TABLE II  
FRONTAL LOBE TUMOR

Author	Year	No. Cases	Euphoria Hyperactivity	Personality Alteration	Depression Retardation	General Intellectual Deterioration	Loss of Initiative	Memory Loss	Attention Defect
Jastrowitz	1888	—*	x		x				
Oppenheim	1889	13	x						
Williamson	1891	50	x		x	x	x	x	x
Lloyd	1892	—	x	x	x		x		
Dercum	1902	3		x			x		
Pfeifer	1910	13	x	x		x			
Baruk	1926	30	x	x		x			
Nonne	1927	2	x	x	x				
Schwab	1927	—		x				x	
Moersch	1929	234	x	x	x	x	x	x	x
Holmes	1931	—	x	x	x				
Henry	1932	—				x			
Kennedy	1933	—	x	x	x	x		x	
Minski	1933	58	x	x	x				
Voris et al.	1935	314		x			x		x
Frazier	1936	105	x	x					
Hyland & Botterell	1937	30	x	x	x				x
Shamboorov	1938	20	x		x	x			
Duss	1939	30	x	x			x	x	
TOTALS:			15	14	10	8	8	5	4

\* Where the number of cases is not given, this either was not reported by the author or could not be obtained from an abstract of the original paper.



Personality changes were observed as often in cases of brain tumor as they were in traumatic lesions of this same area. Schwab (121), Hyland and Botterell (66), and Voris, Adson, and Moersch (131) have all emphasized such alterations in the general personality structure as the basic mental symptom in frontal lobe tumors. Observations of such cases by Dercum (20), Baruk (3), Nonne (96), Holmes (62), Kennedy (71), Minski (89), and Frazier (32) have served to point out further the frequency with which such alterations of personality occur.

"General intellectual deterioration" is reported by Williamson (136), Pfeifer (103), Baruk (3), and Minski (89) in their studies of frontal lobe tumor. Holmes (62), Kennedy (71), and Shamboorov (122) place particular emphasis upon the general intellectual defect which they observed. However, this general change is reported far less frequently in tumors of the frontal region than in cases of other traumatic lesions of the same cortical area.

Distractibility of attention is mentioned only in the studies of Williamson (136), Holmes (62), Shamboorov (122), and Frazier (32) and loss of spontaneity or loss of initiative seems to occur less frequently in tumors than in cases of other lesions of the frontal lobes. However, Williamson (136), Dercum (20), Pfeifer (103), Moersch (91), Holmes (62), and Shamboorov (122) have all observed such apathy in their tumor studies. A general memory defect is reported by Williamson (136), Moersch (91), and Minski (89) while Holmes (62) notes that an impairment of recent memory function constitutes the only memory weakness in frontal tumors. The literature on tumors of the frontal region makes no mention of a specific disturbance in abstract thinking which was noted quite frequently in other frontal lobe lesions.

In a thorough study of 30 cases of tumor of the orbital surface of the frontal region, Duss (23) has placed great emphasis upon alterations in the personality of the patients. The nature of these changes is said to be related to the previous personality patterns in individual cases. Duss localizes the personality alterations in the orbital surface of the frontal lobes since they always appear in the very early stages of the disease. However, with progressive growth of the neoplasm, other regions of the frontal lobes become implicated so that loss of spontaneity and apathy become dominant symptoms and frequently conceal the earlier and more fundamental personality changes which Duss believes are specific to the orbital region.

In general, the symptoms most often observed in frontal lobe tumors are essentially the same as those noted in traumatic lesions of the frontal region. However, several of the alterations noted do not appear as consistently in cases of tumor as they do in traumatic lesions. In general, however, the mental changes emphasized are the same in both types of frontal lobe disturbance.

3. *Frontal Lobe Ablation*: The final form of frontal lobe disorder to be considered is covered in a group of qualitative studies of the mental changes following ablation of one or both of the frontal lobes. Since the animal studies in this field are not included, the number of observations is very limited. Further, in the few opportunities that have occurred for observation of the effects of frontal lobectomy in human subjects, mental or psychological changes have rarely been detected.

a. *Unilateral Ablation*: In 1928, Dandy (18) found no mental deficits of significance in a case of removal of the left frontal lobe. O'Brien (98) reports a case of right frontal lobectomy in which qualitative observation yielded no discernible impairment. In 1934, Penfield and Evans (101) reported two cases of unilateral frontal lobectomy. The first case underwent removal of the right frontal lobe and no mental changes were noted. The second case reported was that of an excision of the dominant or left frontal lobe. Clinical observation of this patient following operation revealed a slight loss of initiative



and a notable impairment of abstract thinking. No other significant psychological alterations were seen. In 1937, Rowe (111) reported a case of right frontal lobectomy where a recent memory defect and some emotional lability were observed post-operatively. At the same time, Jefferson (69) had opportunity to study carefully six cases of unilateral frontal lobectomy. Three of the cases were right frontal ablations and three involved removal of the left frontal lobe. Concerted study and observation revealed no psychological changes or defects in any of the patients post-operatively. Jefferson's study served to point out that unilateral lobectomy in the frontal region produces no qualitatively observable mental changes regardless of the laterality of the ablation. Removal of the so-called dominant frontal lobe resulted in no discernible impairment of mental functioning. However, in instances of bilateral removal of the frontal lobes involving the corpus callosum, there does appear to be evidence of mental symptomatology following the surgical procedure.

In 1938, Messimy and German (88) observed psychological symptoms in three cases of right or non-dominant pre-frontal lobectomy. An attitude of hostility was noted in all cases. Carelessness, irritability, and occasional euphoria were present and one patient reported visual and auditory hallucinations following lobectomy.

b. *Bilateral Ablation*: In 1935, Ackerly (1) described a case of frontal lobectomy involving removal of both lobes. The symptoms were said to be of a mild nature, but there was a definite tendency toward occasional euphoria along with a peculiar attention disturbance. Following bilateral lobectomy, the patient showed a marked and consistent tendency toward decreased distractibility. When performing certain tasks, she paid little attention to what normally should have been distracting stimuli. However, Ackerly states that the patient manifested no detectable intellectual deterioration, no memory defect, nor any loss of spontaneity. These findings are consistent with those reported by Hunt and Nichols (65) in a study of a case of partial bilateral frontal lobectomy.

In 1936, Brickner (12) reported a concerted qualitative study of a case of bilateral frontal lobectomy with very marked changes of a psychological nature. The psychological studies which this patient underwent will be discussed in a later section. However, he was observed for about six years and there are very few life situations in which his behavior and verbalizations have not been recorded. The study is a most complete and adequate one and reveals certain striking mental changes. Following operation, the patient showed primarily a marked distractibility of attention, euphoria, loss of initiative, possible intellectual deterioration, and particularly marked personality changes in the direction of puerile boastfulness with asocial and immoral speech and behavior. An impairment of abstract thinking was noted by Brickner and was referred to as "an inability to synthesize mental engrams." This defect is postulated as the basic frontal lobe mental deficit by the author and is said to be fundamental to all the psychological manifestations which the patient demonstrated. In 1939, Brickner (13) reported a follow-up study upon this patient which revealed no essential or significant change in his mental symptoms. There was, however, some slight decrease in the severity of the symptoms, but they still persisted.

Freeman and Watts (33) believe the basic function of the frontal region to be concerned with the projection of the individual into the future. With this area intact, the individual is able to foresee and predict the results of his behavior with reference to his specific goals. All other suggested functions of the frontal lobes are said to be subsumed under this broad function and are but means whereby projection into the future takes place. This conclusion was reached after a study of 48 cases of bilateral frontal lobotomy in an attempt to relieve certain neurotic and psychotic symptoms. The authors state:

The frontal lobes are not centers of intelligence nor of emotion, nor are they directly concerned with the energy drive of the individual. They assemble the available data,



synthesize them, plan a course of action with the ideal in mind, and, equipped with energy of response and with appropriate affective tone, project the individual into the future, direct him toward his goal—and criticize his shortcomings.

More recently Freeman and Watts (34) state that the frontal lobes serve to maintain appropriate affective tone in relation to consciousness of the self. The therapeutic mechanism involved in frontal lobotomy is said to consist of the blunting effect upon the affective tone in this respect. Such a release of strong emotional attitudes with reference to the ego would account for the beneficial therapeutic effects of lobotomy operations in obsessive, depressive, and hypochondriacal states.

Unfortunately, the number of patients undergoing frontal region ablation is limited and opportunities for post-operative study have been restricted. In general, however, the clinico-descriptive studies of these patients do permit some broad generalizations. It appears that in most instances, qualitative observation does not reveal any marked detectable mental impairment in unilateral frontal lobectomy whether it be the dominant or non-dominant lobe which has been removed. Nevertheless, Penfield and Evans (101), Rowe (111), and Messimy and German (88) observed definite mental alterations in their cases of unilateral removal. With reference to bilateral removal of the frontal lobes, both Ackerly (1) and Brickner (12) reported psychological changes in their studies. In those observations where psychological changes were noted, the symptoms appear to be similar to those seen in cases of traumatic lesions and tumors in the frontal region. However, in the cases of frontal excision, there seems to be a marked decrease in both the consistency of appearance and the severity of the mental symptomatology.

On the basis of the qualitative studies of the psychic symptoms of frontal lobe pathology, it might be possible to formulate a general frontal-lobe mental syndrome. However, before such an attempt is made, it seems necessary to consider the descriptive studies of disturbances in other regions of the cortex to determine whether or not such mental changes are specific to the frontal region of the brain.

### *B. The Temporal Cortex*

On the basis of the number of studies in the literature dealing with the mental changes in different cortical areas, one may surmise that psychological manifestations are far less frequent in disorders involving the temporal region than in cases of frontal organic brain disease.\* The majority of the qualitative studies of the temporal regions have been chiefly concerned with various types of sensory dysfunction which appear to be frequently related to temporal lesions or tumors. Most studies have been directed toward the problems of auditory and visual agnosia which are frequent symptoms in disease of this area of the brain. Also, the presence of gustatory and olfactory hallucinatory phenomena often occurring with epileptiform seizures have received much emphasis and study, possibly at the expense of other mental alterations which have been observed by some investigators. There are a few descriptive studies which do report certain psychological changes in disease of the temporal region and these will be summarized in an attempt to establish the presence of mental symptoms which may be referred specifically to brain disease of the temporal lobes.

1. *Temporal Lobe Tumor:* The most frequent mental symptom associated with tumor of the temporal region appears to be a visual disturbance, usually of a hallucinatory

\* Since it was necessary to place some arbitrary restrictions upon the scope of this review, all studies dealing with the problem of aphasia and organic brain disease have been omitted. In many instances, it appears that aphasic disturbances are closely related to symptoms described above.



nature. The hallucinatory experiences also frequently tend to be of an olfactory and gustatory kind and are generally found to precede some sort of epileptiform fit, usually of the uncinate or Jacksonian type. Martel and Vincent (87), Kennedy (71), Kolodny (79), Henry (60), Stone (125), Lemke (82), and Keschner, Bender, and Strauss (72) have found such symptoms in cases of temporal lobe tumor.

Kolodny (79) studied 38 cases of temporal lobe tumor and found a definite memory loss in 19 of the cases. The memory defect appears to be more striking in cases of left-sided tumor than in right-sided involvement. Also, the memory defect is said to involve memory for both recent and remote events as opposed to the predominance of the recent memory defect in cases of frontal lobe tumor.

Of the 110 cases reviewed and studied by Keschner, Bender, and Strauss (72), 50 per cent showed some type of memory disturbance. According to the authors, the defect lay primarily in the spheres of "retention and recollection" while "recognition" was found to be the function least affected. Since memory impairment is found with equal frequency in frontal region tumors, the writers conclude that memory function is probably related to the structural integrity of the entire cortex. They also suggest the development of adequate non-language tests of memory so that the presence of quite intact memory ability will not be obscured by aphasic disturbances often noted in these cases.

Moersch (91) observed a memory defect in several of 22 cases of temporal tumor, but does not further qualify the exact nature of the impairment nor its severity. Studies by Golla (46) and by Lemke (82) also make vague reference to a memory deficit in such cases. Minski (89) studied a number of patients with left temporal tumor and observed that recent memory was initially affected, but in the later stages of the growth, remote memory also became involved and the impairment appeared to be a generalized one. The author believes this to be characteristic of the typical memory loss in organic brain disease.

Distractibility of attention was noted in cases of temporal tumor by Knapp (78), Holmes (62), Moersch (91), and Keschner, Bender, and Strauss (72). However, this symptom does not receive great emphasis and was apparently not observed in many of the qualitative studies. Loss of initiative or lack of spontaneity is reported by Kolodny (79), Golla (46), Keschner, Bender, and Strauss (72), Moersch (91), Schuster (120), and Minski (89) in their observations upon patients with temporal tumor. Personality alterations similar to those observed in cases of frontal region tumor are reported and emphasized by Kolodny (79). However, he finds that the mental manifestations do not occur with the marked frequency with which they are seen in frontal tumors and that they also appear in later stages of the disease process in temporal growths. Keschner, Bender, and Strauss (72) noted personality changes as frequently in temporal tumors as in frontal lobe tumors and concluded that such a symptom was therefore of no localizing value. Minski (89) also reported such changes and felt that their occurrence depended primarily upon the rate of growth of the tumor and the previous personality rather than upon any specific localization of the tumor within the cortex. Stone (125), Kennedy (71), Knapp (78), Brain (10), and Moersch (91) all report the occurrence of personality changes in their cases of temporal tumor.

Changes in mood tone and psychomotor tempo are also reported in cases of temporal tumor, but to a far lesser degree and frequency when compared with their occurrence in frontal lobe tumors. Kolodny (79), Minski (89), Keschner, Bender, and Strauss (72), and Moersch (91) all make mention of such manifestations which apparently have been noted as tending toward either euphoria with hyperactivity or toward slight depression with psychomotor retardation. "General intellectual deterioration" is described in some cases by Minski (89), Moersch (91), Lemke (82), Keschner, Bender, and Strauss (72), and Torkildsen (129). Minski (89) more specifically defines the defect as one affecting primarily "judgment, critical faculty, and discrimination." However, with reference to this symptom as well as in the case of reported memory defects, one must be very cau-



tious in interpreting the nature of the memory or intellectual defect. The very frequent occurrence of aphasic conditions in temporal lobe involvement may confuse the picture unless one follows the suggestion of Marie (86) in believing that sensory aphasia is but a manifestation of a general intellectual defect. The need in this problem is one of developing more accurate and discriminating non-language or performance tests devices and techniques. This would appear to be the only manner whereby the relationship between aphasia and intellectual impairment can be tested and accurately described.

2. *Traumatic Lesions—Ablation:* In the case of lesions of the temporal lobes other than of those associated with tumors as described above, there are relatively very few clinical descriptions of mental symptomatology. In general, where they have been noted, they are basically the same as those observed in cases of tumor, except that possibly there is a lesser degree of severity. Again, in the case of ablation or temporal lobectomy, the number of studies reported which deal with the psychological status of the patient are very limited. Fox and German (28) observed marked euphoria, emotional instability, and some loss of initiative in their cases. Nielsen and Raney (95) noted a generalized memory defect, but emphasized the lack of any personality changes in reporting the results of their observations. Aphasic disturbances were almost always observed in such cases. In short, mental changes appear to be most frequent and most marked in tumor of the temporal lobes. Other forms of disease in this region of the brain do not seem to produce mental changes with the same frequency or severity. However, one must be aware of the limited number of observations of the mental symptoms in patients with traumatic lesions or excision of the temporal cortex. Nevertheless, certain conclusions do seem to be possible since the absence of reports of such observations in the literature would suggest that such symptoms were not noted and therefore probably were not present to any consistent degree.

It appears that the frequency of appearance of psychological alterations in temporal involvement is far less than that found in frontal region disease. Nevertheless, where such mental manifestations have been observed, it is noteworthy that they are much the same as the mental changes described in connection with frontal lobe disease. The inevitable question which arises involves the degree and incidence of the cortical spread of dysfunction or the "diachisis effect" suggested by von Monakow (92). Brain (10) states that the greatest difficulty in localization of brain damage lies in the fact that too often the local symptoms cannot be separated from the secondary or more general symptoms which result from generalized increased intracranial pressure. Such a diffusion of damage within the cortex may well explain the overlapping of the mental symptomatology in frontal and temporal lobe disease when mental changes have occurred in the latter region. The fact that mental symptoms appear later in the disease process in temporal region involvement and are also more common in temporal tumor, where increased intracranial pressure is most common, are consistent with such an explanation. That is, it appears that temporal involvement may secondarily produce organic changes in the frontal region either through the production of scar tissue in that area or through generalized increased intracranial pressure affecting the frontal area of the cortex.

### *C. The Parietal and Occipital Cortices*

Brain disease localized within the parietal or occipital regions is not found to be related to any consistent psychological changes with reference to either intellectual or affective functioning. The parietal area of the cortex contains the great somesthetic area and damage in this region is generally correlated with various types of sensory-perceptive disturbances. Psychophysiological functions



show numerous and variegated types of impairment. Disturbances involve faulty discrimination of intensities of pain, touch, and temperature stimuli along with an inability to localize the stimuli spatially. Patients show impaired two-point discrimination and are often unable to recognize objects in terms of their weight, size, form, or texture, i.e., they display astereognosis. Various types of aphasic disturbances have also been observed in cases of parietal brain disease.

Henry (60) has studied several cases of tumor of the parietal lobes and concludes that there are no mental changes which are of any localizing value. Hardwick (53) reports no intellectual defect in a thorough study of a patient with parietal lobe injury. However, disturbances of the body scheme or a lack of awareness of parts of the body has been reported in cases of parietal damage with very great frequency and consistency. Such a disturbance has been emphasized by Schilder (118), Hoff and Pötzl (61), Gerstmann (37), Gurewitsch (50), Krapf and Courtis (80), and Wagner (133). Related to this general disturbance of the body scheme is a peculiar inability to discriminate between individual fingers of the hand. Gerstmann (37) and Schilder (118) have observed finger agnosia in several cases of parietal lobe involvement. Alexic, agraphic, and apractic disturbances also appear to occur with significant frequency.

Other symptoms less frequently observed in parietal lobe disease include a rather specific defect with reference to the performance of relatively simple arithmetical calculations. These have been emphasized by Gerstmann (37) and Krapf and Courtis (80). Engerth (24) and Schilder (118) speak of a specific impairment of tri-dimensional vision of parietal brain disease, the former also finding a peculiar inability in the use of blue colors. Further specificity of localization of psychological function is attempted by Stief and Csajaghy (124) who seek to localize mirror-writing in the left parietal lobe. Gerstmann (37) believes that finger agnosia, right and left disorientation, agraphia, and acalculia occur with such frequency that they may be grouped together to constitute an interparietal syndrome.

In general, one finds that the alterations occurring with parietal pathology are generally of a psychophysiological rather than a more strictly psychological nature. Mental changes such as were observed in cases of frontal and temporal lobe damage are not seen with any consistency. However, there does remain the problem of the application of psychophysical methodologies to the sensory-perceptive defects qualitatively observed in parietal cases with an end toward more accurate and objective measurement of the extent and nature of the defects which have been described clinically.

For purposes of the present review of symptoms, the occipital region can be relatively rapidly dismissed. The literature contains no mention of the occurrence of mental changes of an affective or intellectual kind with occipital lobe pathology.

Penfield and Evans (101) specifically state that there is no intellectual disturbance in such cases. In general, disturbances within the visual sphere constitute the most frequently observed symptom. Visual hallucinatory experiences have been noted rather consistently and are reported by Henry (60), Balado, Adroque, and Franke (2), Horrax and Putnam (64), and Kessel (73). Nielsen and Von Hagen (94) found astereognosis in all of three patients with lesions in the occipital region.

#### *D. Conclusions From the Qualitative Studies*

Studies of the mental phenomena occurring with frontal lobe pathology demonstrate that there are certain psychological symptoms which occur pre-



dominantly in instances of tumor and other traumatic lesions with such marked consistency that they may be tentatively considered as a frontal lobe mental syndrome. It has also been found that similar symptoms occur very frequently in cases of temporal lobe tumor, but less frequently in instances of traumatic lesion or ablation of the temporal lobes. With the exception of tumors, the mental changes in temporal brain disease are milder in degree and occur later in the disease process than is the case in involvement of the frontal cortex. However, the mental symptoms which occur in pathology of the frontal and temporal regions are essentially the same. These manifestations include distractibility of attention, loss of spontaneity, alterations in the general intellectual deterioration, memory loss, and changes in mood tone and psychomotor tempo. These symptoms are not reported in cases of parietal and occipital brain damage. In the former, the symptoms are primarily psychophysical defects while the latter situation gives rise to disturbances mainly affecting the visual sphere. In neither case are the symptoms strictly psychological.

The overlapping of the mental changes in frontal and temporal lobe disease has been attributed to diffusion of damage within the cortex. It has been suggested that the psychological changes reported above are due either to focal or secondary involvement of the frontal cortex. Focal temporal lobe disease may give rise to psychological changes by virtue of secondary implication of the frontal lobes by means of a spread of the pathological process. This is consistent with the finding that psychological changes in focal temporal lobe disease usually occur later in the disease process than they do in primary frontal lobe involvement.

Although mental symptoms have only rarely been noted in cases of unilateral frontal lobectomy, it is of considerable importance that when such manifestations were observed in such cases, these have been essentially the same as those mentioned above. With the exception of Brickner's (12) study, symptoms noted in bilateral as well as unilateral frontal lobectomy cases have generally tended to be much milder in degree than in cases of tumor and other lesions of the frontal cortex.

Brickner (14) has suggested an explanation for the relative absence of mental changes in cases of unilateral frontal lobectomy. This hypothesis appears to involve two supplementary principles. It would seem that psychological function is bilaterally represented in each of the two frontal lobes. Therefore, the absence of psychological changes following the removal of one of the frontal lobes may be explained in terms of the capacity for one lobe to take over the functions of the other. Anatomically, this would assume an intact corpus callosum which serves to integrate both frontal lobes. In short, the absence of some frontal region tissue does not produce observable mental changes because of the existence of a mechanism for a functional inter-lobular transfer. However, it appears further that such a functional transfer cannot occur in the presence of pathological tissue such as are produced by tumors and other frontal lesions. In the latter cases, the severity of the psychological alterations was most marked regardless of the laterality of the pathology. Symptoms are most severe with increased intracranial pressure and scar tissue present in the frontal region. In most lobectomy operations, attempts are made to remove all scar tissue and, of course, intracranial pressure. The conclusion toward which one is inevitably led is that the presence of pathological frontal tissue results in positive mental symptomatology whereas the absence of frontal tissue as is the case in unilateral frontal lobectomy gives rise to negative symptomatology because of the existence of such a mechanism for functional transference between the two frontal lobes.



### III. THE APPLICATION OF PSYCHOLOGICAL TEST TECHNIQUES IN ORGANIC BRAIN DISEASE

In recent years, clinical psychologists have shown increasing interest in the application of test procedures to the problems of organic brain pathology. The two fundamental factors which may serve to explain the advent of the psychologist into this field might well be the gaining interest in the psychological changes associated with brain pathology along with the attempts of psychologists to attain higher specialization and specificity in terms of test development and application. Numerous instances of traditional fixations in this developmental process are still seen, however. Conventional methods are clung to despite repeated demonstrations of their inadequacies. This section will be concerned with the presentation of the status and development of the use of psychological test techniques in organic brain disease.

Studies along these lines may be grouped into two broad descriptive categories.

1. Those investigations of functional deficit in organic cases which have employed only the conventional or gross tests of general intelligence or performance ability. These will be referred to as the studies utilizing *unspecialized* test techniques.
2. Those studies which utilize *specialized* test techniques. These latter studies involve attempts to analyze the exact nature of the intellectual defect and also include attempts to measure the existence of psychological symptoms other than alterations in the intellectual sphere.

#### A. The Use of Unspecialized Tests

"General intellectual deterioration" appears to have been one of the most frequently observed symptoms in cases of frontal and temporal tumors and other lesions. This has resulted in a number of psychological studies in which the conventional tests of general intelligence have been employed. All of the other qualitatively reported mental changes tended to be ignored since the technical devices required for measuring general intelligence were more readily available. In general, these studies consist of psychological examinations before and after the removal of brain tissue. The results are then compared with the end of determining the effect of surgical removal of brain tissue upon general intellectual functioning.

These studies have generally utilized the Stanford-Binet scale along with occasional performance test scales. The fundamental conclusion to be drawn from such investigations is that no deterioration of general intellectual functioning can be found following the surgical ablation of cortical tissue. Studies of this type have been made by Hebb (57) (58) and Hebb and Penfield (59).

Hebb (57) studied four cases of extensive ablation of the left frontal lobe. The revised Stanford-Binet test was utilized to determine the general intellectual level and the Arthur Performance Scale and the McGill Revision of the Army Beta test were employed to compare language with non-language test performance. The author concluded that the effect of left unilateral frontal lobectomy upon intelligence test performance is practically negligible. Pre- and post-operative tests were made upon but one of the four cases; in this there was no change in the IQ after operation. The other three cases were only examined post-operatively and were found to be above average.

Hebb and Penfield (59) report test results before and after operation in a case of extensive bilateral removal from the frontal lobes to remove scar tissue following a traumatic brain injury. A comparison of the Stanford-Binet pre- and post-operative results indicates an average gain of 10.8 IQ points when the four post-operative tests are com-



pared with the test results before surgery. The improvement upon the performance tests after operation is even more striking. Although the effect of practice must be considered in interpreting these test results, it is significant that no lowering of the intellectual level can be inferred.

Hebb (58) reports a case of removal of the right temporal lobe. The patient attained a Stanford-Binet IQ (Form L) of 113 following operation. No tests were administered before ablation in this case. However, the writer concludes that retention of verbal intelligence following temporal ablation does not preclude the possibility of defects in other psychological abilities. This patient showed a marked and consistent impairment upon all the performance or non-language tests administered. Hebb attributes this to a disturbance of form perception, both visual and non-visual. The discrepancy between the results of verbal and non-verbal tests of intelligence is the most striking feature of this particular case.

Lidz (83) reports pre- and post-operative Stanford-Binet and performance test results in a case of unilateral frontal lobectomy for the removal of a tumor. Again, no impairment of formal intelligence can be found following surgery. Ackerly (1) reports psychometric findings in a two-year post-operative study of a case in which there was extensive removal of both frontal lobes. No quantitative data are presented, but the author concludes that Stanford-Binet examination of intelligence demonstrates no functional defect and that the results of "three memory tests" demonstrate no impairment whatever in that sphere. The only possible disturbance found was a slow performance upon the Arthur Performance Scale, but the quality of the test performance was good. Rowe (111) found a Stanford-Binet IQ of 115 in a case of removal of the entire right cerebral hemisphere. No tests were made before hemispherectomy. The author also concludes that such extensive removal of brain tissue results in no impairment of general intelligence, although he does state that there is some disturbance in recent memory functioning.

Worchel and Lyerly (138) were able to obtain pre- and post-operative revised Stanford-Binet results from five of their group of thirteen patients who underwent bilateral pre-frontal lobotomy operations in a therapeutic attempt to relieve conditions of agitated depression. The conclusions of the authors are well expressed in their own words:

An interesting problem presented by such operative procedure concerns the intellectual functions of the prefrontal lobes. The question naturally arises whether cutting nearly all the association fibres in the white matter of both prefrontal lobes affects certain intellectual capacities. Only precise psychological testing with adequate controls and strict adherence to the scientific method can yield valid answers. . . . In all these cases, the reexaminations after the operation yielded almost identical results to each individual test item as compared to the original tests prior to operation. The slight changes were not significant or consistent.

It appears that the findings of Worchel and Lyerly (138) are especially significant since one may assume that their patients were not suffering from any type of organic brain disease when the pre-operative test results were obtained. Their cases were diagnosed as agitated depression which is generally assumed to be a "functional" mental disorder without organic basis. On the other hand, the studies of Hebb (57), Hebb and Penfield (59), and Lidz (83) are of a nature that is different since they are actually comparing intelligence test performance in the presence of affected brain tissue with intelligence test performance in the absence of specific brain tissue.

Further evidence of the absence of signs of general intellectual deterioration following removal of cerebral tissue is seen in the test results reported by Halstead (52). He gave the Stanford-Binet test to some of his patients and was able to obtain pre- and post-operative comparisons upon a few of the cases. None of these showed any notable alteration in the IQ following operation.



These findings with test instruments appear to demonstrate very consistently that conventional tests of general intelligence do not demonstrate any loss of functional ability in patients who have had cerebral tissue ablated in the removal of pre-existing brain pathology. The majority of these studies have been concerned with the frontal region of the cortex. In fact, some of the cases actually show a slight gain in post-operative test results. These general findings are consistent with the explanatory concept developed earlier where it was assumed that there might be a transfer of function from one frontal lobe to the other only in the absence of pathological tissue or absence of increased intracranial pressure. Under such conditions, one would not expect any loss of mental ability following the removal of diseased tissue or pressure. This is precisely what has been found in most of these studies. In the cases of Worchel and Lyster (138) where prefrontal lobotomy was performed bilaterally in patients presumably without organic brain pathology, the absence of intellectual deficit after operation seems amenable to similar explanation. Assuming the excision of a very small amount of frontal tissue upon both sides without significant scar tissue or without pressure, there would still be sufficient frontal lobe tissue present to permit inter-lobular transfer and one might also conceive of possible intra-lobular functional transfer. This could well occur since all association fibres were not severed in the course of the operation. In such a case, one again would not expect to find notable loss of ability upon tests of general or formal intelligence.

Consistent with this interpretation are the intelligence test findings reported by Brickner (12) in the famous case of Joe A. who underwent complete removal of both frontal lobes. An evaluation of a series of tests of formal intellectual ability administered post-operatively in terms of his previous educational and vocational history definitely showed marked functional loss directly after lobectomy. Although there has been a gradual progressive gain in scores with increased post-operative temporal intervals, one can hardly say that this patient has returned to his normal intellectual level. Here one sees a residual intellectual deficit in a case of complete ablation of both frontal lobes.

The results of the psychological investigations employing unspecialized tests of formal intellectual ability lead to one of two paradoxical conclusions. One might accept the findings reviewed above and agree that there is no observable or demonstrable intellectual defect that occurs in cases where there is the structural potentiality for a transference of functional ability. To put it specifically, it may be said that there is no detectable alteration in the intelligence of such patients. The second possible conclusion, possibly more tenable, would hold that disease or removal of cortical tissue always results in some deficit in the intellectual sphere, but that this functional loss cannot be demonstrated through tests of general and formal intelligence. In this view, the nature of the intellectual defect would be conceived of as being a highly subtle and elusive one which requires the breakdown of "general intelligence" into its component parts. Such an analysis of intellectual functioning must be made in these cases before one can conclude with certainty that there is no loss of intellectual ability following even unilateral frontal lobectomy.

The problem which presents itself is one which can only be approached through the development and use of psychological tests of a specialized nature. The techniques should be based upon the analysis of the factors which comprise "general intelligence." Beginnings in this direction have been made. Although they seem to spring from widely divergent theoretical origins, deeper study



demonstrates marked similarity among the investigations. The remainder of this review will be devoted to a study of those psychological investigations of organic brain disease which have endeavored to utilize specialized tests of intellectual abilities as well as other mental functions.

### *B. The Use of Specialized Tests*

1. *Abstract Thinking*: As early as 1870, Fritsch and Hitzig (35) reported a specific aspect of the intellectual process which they qualitatively observed to be impaired in several of 25 cases of traumatic lesions in the frontal cortex. There appeared to be a particular loss of the ability to think abstractly. Later, this defect was reported by Bolton (9), Claude (15), and Grünthal (48). Goldstein was especially struck by this loss of abstract thinking ability and studies by Goldstein and Gelb (40) and by Gelb and Goldstein (36) gave rise to the first specialized psychological approach to this problem with specific test methodologies.

Goldstein and his colleagues were basically interested in the problem of amnesic aphasia for colors in patients with pathology in the frontal region. The large number of war injuries at that time gave them access to numerous cases of traumatic lesions. Their test procedure consisted of the use of the Holmgren Wools which is composed of skeins of various colors and shades. During the original studies of amnesic aphasia in organic cases, the patients were required to sort certain of the skeins together. A stimulus color was presented and subjects were instructed to sort all colors together which belonged with the original stimulus color. The most striking finding of these studies was the very concrete and constricted approach to the problem on the part of the organic patients. They were unable to generalize or abstract in terms of the stimulus color and sorted only a few shades which were practically identical with the stimulus color or shade. Normals do not show this constricted type of sorting behavior. Goldstein concluded that the organic patient can consider but one attribute of a color at a time such as either hue, brightness, or saturation and is also unable to shift sorting bases from one attribute to another. As a result, the patient is limited to a "concrete attitude" because of an impairment of generalization or abstraction ability. He has lost the ability to abstract because he is unable to take simultaneous account of a number of attributes in the situation. Later studies by Goldstein (42, 43) have served to corroborate this finding. He believes this defect to be specific to frontal lobe damage and states that it may be demonstrated in general cortical deterioration since diffusion of brain damage will always affect the frontal region. The author further believes that there is a direct relationship between the degree to which abstract thinking is developed and its susceptibility to impairment in the presence of organic brain disease.

In 1923, von Kuenburg (81) developed a test of abstraction ability of a rather simple nature. She also reports a definite impairment of this function in patients with frontal lobe injury and aphasia. The test procedure involves showing subjects a group of meaningless figures for a very short temporal interval. Immediately afterward, a number of other figures containing some of the figures which had previously been demonstrated are placed before the subjects and they are required to identify those figures which had been demonstrated previously and also to locate them spatially. The abstraction aspect of this technique, however, is somewhat difficult to detect. Mainly, this test demands the integrity of recent memory function along with rapidity of the process of attention and perception. The element of abstraction is involved in the selection of those figures which had been seen to the exclusion of those which had not. Success in such a task demands rapid as well as simultaneous consideration of several of the attributes of the figures.



Rylander (114) has used this test in a later study and it will be further considered in a later portion of this section.

Attempts to get at the impairment of abstract thinking in organic brain injury continued to gain momentum with continued interest in the sorting test technique. In 1927, Weigl (134) published some fragmentary data upon a small number of organic cases and also devised the first object sorting test. His first test consisted of four circles, four squares, and four triangles, each of which appeared in red, green, yellow, and blue. The subjects were thus faced with two possible sorting alternatives. Sorting could be performed according to form or color. However, Weigl was not so much interested in the ability of the patients to sort according to form or color, but was particularly concerned over the inability of his patients to shift their sorting bases from the one to the other. Goldstein had previously mentioned that patients with organic brain disease could be concerned with but one attribute of a problem situation at a time and Weigl's technique was designed to determine whether patients could shift the determinant of their sorting behavior. Although the number of cases studied by Weigl is very limited, in general, his results corroborate the notions of Goldstein and Gelb (40). He further employed a group of normal controls and found their behavior to differ from that of patients. Weigl states that the test must receive qualitative interpretation since very frequently patients are able to shift their sorting attitudes upon the test. However, he cites a hierarchy of various determinants of shifting which range from very concrete to very abstract conditions. It is therefore not only important to note whether or not a shift in the sorting basis occurs, but one must also seek to analyze the factors and situational setting which give rise to the alteration in sorting attributes.

Weigl (134) also utilized an object sorting test consisting of 30 common objects inherently amenable to variegated types of organization or grouping. They could be grouped according to similarity of color, double occurrence, form, or use. A rather "large" number of patients with cerebral lesions were given this test. Again, Weigl found that although patients may be quite able initially to sort in a satisfactory manner, they are unable to shift adequately from one set of organizational factors to another set. The patients are basically concerned only with the practical or "concrete" use of the objects; they do not show the flexibility of the normal adults. Their sorting attitudes are constricted, limited to a single set of experimental organizational factors, and generally concrete in nature. Weigl also found a difference between his patient group and a group of children. Whereas the children were far more concrete in their behavior than the normal adults, their sorting was always changing and taking on new relationships and characteristics. They were constantly modifying their sorting performances and making naive attempts to shift among the several possible sorting categories. This activity differed from the constriction and monotonous type of behavior generally manifested by the patients. From these results we may conclude that the patient with organic brain damage reveals an impairment of abstract thinking as demonstrated by the sorting test techniques. Weigl finds further that this defect does not consist of a regression to a more infantile type of abstract behavior, but is rather a definite pathological invasion of the abstraction process.

Goldstein (44) maintains that the "concrete attitude" to which the patient with brain injury is relegated is the basic personality defect in such cases. Other organic manifestations of a less general character are for the most part but embellishments of the more primary and fundamental defect in the ability to think abstractly. In recent years, associates of Goldstein have continued in the application of psychological test techniques to the problem of organic brain disease in terms of this same basic theoretical framework. However, attempts were made to get at the abstraction process in patients with organic brain disease with the use of test devices other than the sorting technique.



Nadel (93) compared the results on a battery of tests of a group of fifteen patients whom competent neurologists had diagnosed to be suffering from damage in either the left or both frontal lobes. The results obtained with these patients were compared with the findings on a control group of patients diagnosed as suffering from organic brain involvement in some region other than the frontal area. The patients in both groups were clinically stated to be mentally deteriorated. Nadel employed, first, a modification of the Kohs Block Design Test which was graded in terms of differential levels of abstraction requirement. The second test consisted of the Goldstein adaptation of the Holmgren Wools. This test has already been described. Thirdly, the Stick Test was utilized. This consists of the manipulation of a group of small sticks in the exact reproduction of a sample figure exposed for a limited period of time. The period of exposure depends upon the relative difficulty of the figure in terms of the degree of abstraction required. Finally, the Manikin and Feature Profile of the Pintner-Paterson Performance Series were presented to the patients. These latter tests are at present components of the Object Assembly test item of the Bellevue Intelligence Scale.

In general, all the tests demonstrated differences between the patients with frontal lobe involvement and the patients with brain damage in other regions of the cortex. The patient with frontal lobe disease can utilize only the simplest approach to these problems. He is successful only with the concrete and the familiar. He is unable to shift from a concrete to a more abstract set and has lost the "categorical attitude." He is totally unable to formalize higher generalizations. These are the actual and the implied conclusions of Nadel.

It appears that the basic loss of abstracting ability in frontal region dysfunction can be approached and demonstrated with techniques other than sorting tests. The development of test methodology would seem to be dependent largely upon the definition of abstracting ability. Abstraction appears to consist of two fundamental component processes. First, there is extraction of pertinent detail from the whole and secondly, there must occur a new synthesis and generalization of parts into a new whole. The sorting test techniques as well as Nadel's techniques make demands upon both of these basic functional abilities. It matters little upon which of these component processes the emphasis is placed since it appears as an empirical fact that a defect in one always presupposes an impairment of the other.

In 1939, Rylander (114) presented the results of a concerted and exhaustive psychological study of 32 cases of partial frontal-lobe excision for the removal of brain tumors. In 20 of the cases, the operation involved the left frontal lobe and in 12 cases the right frontal lobe was affected. An extensive battery of specialized psychological tests were administered to each patient following operation. A control group of normals were matched as closely as possible with the patient group in terms of age, occupation, and socio-economic status. Test results are quantitatively treated and the resultant differences between the patient and control groups upon all of the tests employed are expressed in terms of critical ratios of the differences between the means. The author is enthusiastic in his justification of the concerted use of psychological test methods in his study. He states:

... Special measures are necessary for the tracking down of the mental changes that can be expected to appear after unilateral frontal excisions, particularly since these changes are something quite new to psychiatrists and neurologists,—something entirely apart from the usual disease pictures. . . . Is there any difference between experimental psychological examination and the usual descriptive clinical procedure? It has been said that there is none. . . . Every psychiatric examination is something of an experiment. But, it is a very poorly controlled experiment and difficult to organize, the conditions under which it is performed are never fixed, and the results present a tangled skein of



objective observations and subjective opinions. In the real psychological experiments, there are real hard-and-fast rules for the experimental conditions and the observations are recorded in a uniform manner. A considerably higher degree of objectivity is therefore rendered possible and the results are comparable from case to case.

Rylander employed three tests in his battery which were designed primarily to measure abstract thinking ability. Kuenburg's test which has been previously described was employed along with Rothmann's (109) sorting test. The latter is an object-sorting test very similar to that of Weigl's (134) except that there are far fewer objects to be handled upon the Rothmann test. Significant differences between the patient and control groups were found upon both these tests indicating an impairment of abstract thinking ability in the cases with unilateral ablation. Patients with left frontal excision encountered greater difficulty with the Rothmann test than those with right frontal excision. Also, a difficult version of the Terman (128) Word-Naming test was used. Patients were required to name 60 nouns within three minutes with their eyes closed. The integrity of what Goldstein has termed the "categorical attitude" would enable one to name more nouns since words could be organized in terms of specific classes or categories. The difference between the groups upon this test was also significant statistically, indicating poorer performance on the part of the frontal lobe cases. Other tests of generalization included tests of Fable Interpretation and Interpretation of Proverbs, both of which demonstrated marked differences between the patient and control groups.

Again, the presence of impairment of abstract thinking is corroborated. It is further notable that much methodological progress has been made. On the one hand, Rylander has utilized a specialized group of quantitative psychological devices. Secondly, and of great importance, is the fact that the performances of patients without frontal tissue are being evaluated against performances of normal persons with intact frontal tissue. In other words, the author has departed from the comparison of the same patient's performance upon tests given pre-operatively and post-operatively. In the latter, one is obtaining a measure of the difference between performances in two specific types of brain disorder. To seek out first the more obvious differences between normals and patients would appear more important and certainly more fundamental. Once these differences are satisfactorily depicted, one would be able to make an analysis of the differences in test performance in different forms of brain disease with far greater understanding and insight. The study of Rylander indeed represents a step in the proper direction.

The most recent investigation of abstract thinking capacity in cases of organic brain damage is that of Halstead (52) whose basic point of departure was Goldstein's notion of the "loss of the categorical attitude." His technique involved the use of an object-sorting test consisting of 62 objects of different weight, size, shape, color, brightness, hardness, and positional placement. The development of the specific technique derives from Klüver's (77) method of equivalent stimuli which involves the selection of similarities and dissimilarities from a group of presented stimuli. The group comprised twelve patients with unilateral frontal extirpation, six with unilateral temporal extirpation, two with removal of the right parietal lobe, four with unilateral occipital extirpation, and a patient with the whole of the left hemisphere of the cerebellum removed. A very well matched control group was employed and test performances of the patients were compared with the behavior of this group.

Halstead concluded that the patients with frontal lobe extirpation showed the greatest departure from the type of performance revealed by the normal group. The patients with disorder in the more posterior regions of the cortex also differed from the normals upon the test, but the difference was far less marked. The patients with temporal lobe



disease showed the second largest discrepancy from the normal group, but Halstead states that they probably had some tumor tissue irradiating to the frontal cortex. The patients with frontal lobe abnormalities employed fewer test objects in their sorting behavior than any other experimental group and also produced a smaller total number of sorted groups or categories than did the normals or the other pathological groups.

Halstead also employed the Stanford-Binet upon several of the patients, but was unable to detect any evidence of formal general intellectual deterioration as measured by this test. Nevertheless, his results clearly demonstrate the presence of an impairment of abstract thinking which was particularly striking in the patients with dysfunction in the frontal region of the brain. The author states:

We have elsewhere noted the unusually "good" postoperative social adjustments which some of them had made. Secondly, many of these cases are neurologically negative in the sense that they present no neurological "signs" of their intracranial lesion. Claims in the literature concerning the absence of psychological changes in personality following operations upon the brain must be interpreted with great caution.

Halstead further noted that upon occasion, some of the patients with frontal lobe excisions were able to shift their sorting bases among the various sorting principles permitted in the test. He states that they were clearly able to shift their sorting behavior at times and questions the basic premise of Goldstein which assumes that there is an involuntary loss of the abstract attitude which is the primary characteristic of the behavior of patients with frontal-lobe brain disease. Halstead finds that such patients can assume a "categorical attitude" upon occasion and that some more basic controlling factor than mere loss of abstraction ability is involved. However, he does not at present suggest a more basic explanatory concept, although it must be noted that the nature of the defect demonstrated by Halstead does corroborate the earlier findings of Goldstein (42), Weigl (134), Nadel (93), and Rylander (114). The study of Halstead merits further attention in that the behavior of specific pathological cases is compared with the behavior of normal adults. He states:

We insist that for an analysis of function it seems at present more important to study the existence of certain types of grouping behavior in cerebral cases in general than to make statements about the symptomatology of different lobes of the brain.

Regardless of the theoretical framework to which one is partial, it is evident that an impairment of the function of abstract thinking in patients with brain disease in the frontal cortex can be demonstrated. Whether this is a function of a "basic loss of the categorical attitude" or whether this is due to some other factor or factors need not cause too great concern at the present time. The important point is that all investigations, utilizing various types of tests, have consistently shown a difference in the behavior of the patient with frontal-lobe disease when handling such problems.

On the other hand, studies using tests of general intelligence do not reveal the presence of a defect in cases of organic brain disease when results are compared before and after surgery. As previously stated, this is tantamount to a comparison of intellectual function in different types of brain disease and does not involve a comparison of intellectual functioning between normal persons and those persons with organic brain disease. It is to be noted that in the only study in which general intellectual functioning in a large group of patients with frontal-lobe disorder was evaluated against an adequately matched normal group of control subjects, the patients were found to fall far below the level of the normal control group. Rylander (114) studied 32 cases of unilateral frontal excision with the Stanford-Binet test and found a statistically significant



difference between the patient and normal groups. The present review reveals that the difference between normals and patients with frontal-lobe involvement becomes more striking when certain component processes of general intellectual function are analyzed out and studied, namely, the ability to think abstractly. It appears that "general intelligence" still conceals certain specific component elements under its cloak which may be of potential discriminatory value in a comparison of organic and normal cases. Further investigation could profitably be directed toward a more detailed analysis of the functioning of other, specific, aspects of the intellectual process in patients suffering from organic cerebral disease.

2. *Memory*: Memory is another process which may be placed under the heading of "the higher intellectual functions." Actually, it may be termed a component of the intellectual process. The Stanford-Binet and other tests of general intelligence are heavily weighted with reference to test items of memory functioning. Yet, it is surprising to find the relatively limited number of investigations of a systematic nature of memory ability in cases with cortical damage. The earlier qualitative studies of the psychological alterations in brain disease have frequently indicated that memory disturbances are apparent in such cases, but generally these observations are contradictory and confused. Some investigators report no memory defect whatever, others delimit the impairment to recent memory functioning, and some place emphasis upon a deficit in remote memory. Indeed, the need for further investigation of the presence and nature of such a defect with the use of standardized psychological test techniques is a particularly striking one. Perhaps the neglect is due to the fact that memory functioning is believed to be adequately covered in tests of general intelligence. If this assumption be true, and it is a questionable one, investigators have made too little mention of the performances of patients upon the memory items of the tests. It is true that adequately standardized tests of memory are not readily available, but their construction and application would certainly appear no more arduous or difficult than those of tests of abstraction and generalization ability.

It is general text-book doctrine that organic brain disease initially affects recent memory functioning with remote memory ability usually remaining relatively intact. If the organic process be a progressive degenerative one, it is asserted that remote memory will also subsequently become impaired. It is also believed that in very extreme types of organic trauma or disease, both recent and remote memory functions will be spontaneously affected. These conclusions may be said to represent the consensus of numerous qualitative observations. However, it is obvious that gross estimates of memory ability can never be as satisfactory as standardized and quantitative studies of the relative reproduction of recent and remote memories. Only when a large number of distinct organic clinical entities are tested in this manner and compared with each other as well as with normal persons can any valid statements be made concerning memory function in such patients.

Brickner's (12) patient with bilateral frontal lobectomy underwent extensive psychological study by Tallman. Although no specific tests of memory ability were administered, certain conclusions were reached from a consideration of the patient's performance upon items of memory contained in some of the tests presented. It was stated that the patient achieved fair success upon test items dependent upon previous information and teaching, but showed a definite defect in the sphere of recent memory ability. This



was especially notable in the reproduction of digits and there was obvious difficulty with tests requiring the formation of new associations.\* However, later examination revealed a notable return of recent memory functioning and the author doubts the presence of any deterioration of recent memory in a permanent or irreversible sense. Rather, the apparent defect is attributed to emotional and attentional factors which appeared improved at later test sessions.

Lidz (83) employed some crude tests of recent memory ability in his study of a case of right prefrontal lobectomy and found no impairment in this sphere when pre-operative and post-operative results were compared. The first test consisted of showing the patient a list of 25 words for two minutes following which he was asked to select those words from a large number of others which were presented. Also, prior to operation, the patient was made to learn a number of lines composed of 43 words dealing with the subject of muscle physiology. The patient was able to recite these same lines without error or hesitation 25 days after operation. On the basis of these tests, Lidz concludes that there was no defect of recent memory function as well as no post-operative impairment in the reproduction of material learned before lobectomy was performed.

Rylander (114) utilized an adequate and varied group of memory tests in his study of 32 cases of unilateral frontal excision. The tests included measurement of reception, memorization, and retention of diverse types of material. Immediate memory span was tested for both digits and syllables, a paired-associates test was employed, a story was read which later had to be reproduced, and a series of eight three-letter nonsense syllables were exposed with a memory drum until repeated without error by the subjects. Three hours later, the test was repeated and the "savings score" was calculated. The results of the patients' performance upon these tests were then compared with those of a group of matched normal controls. The digit and syllable-span tests along with the story test revealed no significant differences between the patients and normals. The nonsense-syllable memory test demonstrated a statistically significant difference with respect to the number of trials required for the original learning of the list. The patients consistently required many more trials than the normals to master the list. However, although the "savings scores" pointed in the same direction, the difference between the normals and patients was not statistically significant. Upon the paired-associates test, there was no difference between the two groups upon the first trial. However, later trials strongly indicated that the formed associations weakened faster with the passing of time in the case of the patients. This difference was significant when the results of the patients with complete unilateral lobectomy were compared with their matched controls. It is to be noted that the tests employed are directed toward various aspects of recent memory function.

The conclusions to be drawn suggest that the patients show no impairment of immediate associative memory as tested by digit and syllable span and no impairment of retention of recently learned material as revealed by the story and nonsense-syllable tests. However, there is evidence of difficulty in the formation of new associations with rote material as well as evidence of a more rapid dissipation of retention of recently learned associations on the part of the patients with brain ablations. Unfortunately, no specific tests of remote memory function were administered and therefore no comparison of recent and remote-memory ability is permitted in this study. However, Rylander's study of recent memory in these cases is very adequate and it is apparent that his conclusions are not entirely consistent with the qualitative notions of memory functioning derived from cases of frontal excision.

\* Tallman questions the representativeness and the optimity of the tests since the interference of emotional and attentional difficulties was generally very marked during test sessions and frequently the patient was flatly uncooperative and disinterested.



Conkey (16) presents interesting memory results in a group of patients who suffered traumatic head injuries. The basic aim of the study was to obtain information concerning the recovery of certain psychological functions over a period of time following the trauma. Conkey makes the following statements to justify her use of quantitative tests in such a longitudinal investigation:

It is recognized by medical men and those who are in contact with patients suffering from such injuries that at least in a large number of the cases the patients continue to complain of "poor memory," "the inability to keep their attention focused," "undue fatigue after any mental exertion," and other "mental" symptoms, long after the apparent physiological causes have ceased to function, or at any rate, after they no longer manifest themselves in discernible physical signs. We realize that physical and neurological examination still is, and will remain, the basic criterion for diagnosis and therapy in these patients; that tests and quotients cannot replace the opinion and judgment of an experienced clinician; but as Savitsky (117) says, "the day has passed when the neuro-psychiatrist can ask the injured person a few questions and as the result of a brief interview form an opinion as to the intactness of all the psychological processes, the patient's adaptive capacity, and his personality make-up." We wish, therefore, to show a recovery curve in at least some of these psychological functions.

Conkey emphasizes the fact that a patient cannot be said to be recovered until psychological recovery has attained its maximum. Her results clearly demonstrate that recovery of memory ability lags far behind the recovery of other psychological functions and that it is very necessary to distinguish adequately between memory for new and old material in this respect. By a series of retestings over a long period of time, it was possible to obtain an approximate recovery point which could then be evaluated against the probable performance level prior to the brain trauma. She also utilized two control groups. The first consisted of hospitalized patients suffering from ailments other than neurological or psychiatric types in order that the effect of mere hospitalization upon test performance could be studied. The second control group consisted of 30 normal persons matched with the patient group for age, education, economic and social status. The results indicate that recovery can be demonstrated for all psychological functions tested and that maximum recovery appears to occur thirty-four weeks after injury for simple mental activities such as orientation, immediate perception and reception. Recovery of a maximum nature also appears upon tests requiring new learning and perception of an abstract kind about thirty-four weeks after the injury was sustained.

However, the situation was found to be quite different for tests of both recent and remote memory ability.\* With reference to both aspects of memory functioning, the deficit appears to be more permanent since at the end of fifty weeks, the scores of the patients remained significantly below the scores of the normal control groups. Conkey concludes further that the permanence of a generalized memory defect becomes even more striking in the records of individual patients where there had been loss of consciousness and amnesia at the time of the injury. It is to be noted that the residual memory defect found by Conkey is much more marked and generalized than that noted by Rylander (114) and Lidz (83). It seems somewhat similar to the defect remaining in Brickner's (12) patient who underwent bilateral frontal excision. The explanation for the extreme findings of Conkey may well lie in the fact that much pathological scar tissue continued to be present in several of her patients during all of the test sessions. This might conceivably interfere with any functional transfer within the cortex. Such a transfer is not precluded theoretically in Rylander's cases of unilateral excision of frontal tissue.

In his analysis of frontal-lobe function by the sorting-test method, Halstead (52) also included in his test procedure a measure of immediate recall of test objects following a

\* For a complete description of the memory tests employed, see Appendix I in Conkey's monograph.



five-minute recess. The subjects were asked to recall spontaneously as many of the objects of the sorting test to which they had previously been exposed as they could. The findings and interpretation of the results are well stated by Halstead:

When tested for recall after an interval of five minutes, our frontal lobe cases recalled on the average considerably fewer objects from the test-field than did the other types of subjects. While this tendency towards a reduction in recall is marked in the results of the present investigation, it should be noted that the test for recall made was in terms of material of a particular kind, a single interval of delay (five minutes) and a single indicator of recall (verbal). Thus only further investigation can reveal to what extent the tendency noted here is a general one for memory functions of individuals with a frontal lobe lesion.

It appears that Halstead has struck a particularly important note in his reference to the use of only a verbal indicator of recent recall. Verbal tests of memory as well as such tests of any component element of the intellectual process are very susceptible to perversion as a result of possible expressive speech disturbances. Motor aphasic disturbances are especially common in frontal-lobe disorders and the majority of the patients studied psychologically have been of this type. More specifically, believers in strict localization of function have attributed disturbances in expressive speech to a lesion in the posterior portion of the third frontal convolution. The problem arises particularly when tests of memory of a verbal nature are employed since it might be difficult to determine to what extent a low performance is due to actual loss of memory function or to what extent the apparent defect is due to an expressive amnesic or nominal aphasia. The problem as to whether or not aphasic disturbances are indications of a more general loss of intellectual functioning is beyond the scope of this paper. The more general opinion upon this issue appears to be that aphasia may exist quite apart from any inherent intellectual deterioration. The methodological psychological problem in this respect revolves about further work in the development of more adequate non-verbal or performance tests. This is a general demand in the field of organic brain disease and is a special need in the field of memory ability.

Until more satisfactory techniques for the measurement of the various aspects of memory function are developed and until these are applied to a large number of various clinical pathological entities, little of a conclusive nature can be said of memory functioning in organic brain disease. At present, there are far too few studies which have employed satisfactory techniques and a sufficiently large sample of cases. The results have demonstrated nothing that may be considered even a consistent trend, findings being inconsistent and contradictory. Memory functioning in the organic patient is indeed a fertile field for further psychological investigation.

3. *Disturbances in Attention:* Qualitative observations of patients with brain damage in the frontal cortex have consistently emphasized the presence of a striking defect in the attentional sphere. This has usually been described as a state of heightened distractibility. The threshold of awareness and responsiveness to external extraneous stimuli becomes lowered so that one sees a sporadic type of distractibility. Ackerly (1) in his report of a case of bilateral frontal ablation departs from the opinions of other observers of this function in reporting an abnormally high threshold of resistance to the usual distracting external stimuli. However, as it has been previously pointed out, all other descriptive studies of attention in organic brain disease refer to increased distractibility as a predominant symptom (25) (9) (106) (136) (32) (122). Disturbances in attention are also commonly seen in such "functional" mental disorders as manic-depressive psychosis and schizophrenia. However,



qualitative observations of a comparative nature yield differences in the kind of attention defect manifested by patients with organic brain disease. Schizophrenic patients tend on the whole to show a steady and non-fluctuating type of attention defect which is more or less continuously present. This appears to be a function of withdrawal from the reality situation with consistent inner preoccupation. As a result, the schizophrenic patient cannot be made to attend to external stimuli for any significantly long period of time. Continuous pressure has to be applied if one is to attain and maintain his attention. The conflict between the internal and external situations accounts for the observable attention defect—one of preoccupation. The type of attention defect seen in manic patients best fits into the category of "distractibility." The manic, unlike the schizophrenic, is constantly at the beck and call of the external reality situation. The disturbance is consistently present and manifests itself in a fleeting concern with the successive external stimuli which are perceived. In contradistinction to the manic and schizophrenic types of attention defect, the patient with organic brain disease shows a sporadic kind of disturbance whose appearance is usually temporarily unpredictable. It is not of the consistent and steady kind described above; rather, "now you see it and now you don't." The basis for such a defect is more difficult to assign. It may be related merely to the easy fatiguability of organic patients or it may be correlated in some manner with the occasional lability of mood and irritability frequently observed in them. However, one need not be too greatly concerned with the possible etiology. The fundamental practical consideration involves awareness of the inconsistency of the distractibility in the organic patient. This factor should be noted from the point of view of its possible value in differential diagnosis.

Despite the marked emphasis upon defects in attention in organic and other psychotic states, psychological test specialization has been relatively little concerned with this problem up to the present time.

Among the psychological studies of organic brain disease, only those of Freeman and Watts (33) in cases of bilateral frontal lobotomy\* and Rylander (114) in cases of partial unilateral frontal lobectomy have been interested in accurately measuring distractibility of attention. In the first study, Hunt examined 48 patients before and after bilateral frontal lobotomy and employed a cancellation-test technique to measure the presence and degree of distractibility of attention following the surgical production of frontal lesions. Tests were scored separately for speed and accuracy. The speed scores revealed that performances are slower following frontal lobotomy and this difference was reliable. However, after operation the patients made far fewer errors upon the test; 60 percent of the cases demonstrated higher post-operative accuracy scores. This difference was also statistically significant.

A more elaborate psychological study of attention was undertaken by Rylander (114) in his cases of partial unilateral frontal excision for the removal of pathological tissue. He utilized a group of three test procedures. The first consisted of a tachistoscopic presentation of a nonsense syllable of three letters for a period of time of one second. The exposure time was then gradually decreased until three successive failures appeared. Actually, speed of visual perception was being measured by this test. The second involved the reading of a text of 114 words while crossing out all the E's and N's of which there were 200. The number of cancelled letters was assumed to indicate the degree of

\* The psychological examinations were performed by Thelma Hunt in this study and the results were reported by her in a paper delivered at the meetings of the Eastern Psychological Association at Atlantic City, N. J. in April, 1940.



attention. The third test employed required the patient to count backwards from 100 to 0 subtracting 3 each time. The author states that stress was placed upon concentration of attention and endurance rather than upon arithmetical ability. In comparing the performances of the patients upon these tests with the normal control group, one finds that the tachistoscopic and subtraction techniques did not reveal significant differences between the two groups. The only difference which was statistically significant corroborates the finding of Freeman and Watts (33) that after operation the patients required a longer time to complete the cancellation test. Accuracy scores gave no reliable difference between the patients and normals.

At the present time, a final evaluation of the attention defect in patients with organic brain disorders is hardly possible. Both Rylander and Hunt find that patients require significantly longer times upon tests designed to measure this function. However, little more can be said on the basis of the present studies. It would appear that the increase in time scores might well be suggestive of a real deficit in the sphere of attention and that the need is one demanding finer methods of measurement. On the other hand, the accuracy scores might be of greater importance in denoting the absence of any attentional defect in such cases. In such an instance, the poorer speed scores could conceivably have been due to change in psychomotor tempo which is a symptom frequently reported in the qualitative studies of organic brain disease. In the investigations reported by Rylander (114) and Freeman and Watts (33), the dominant trend may have been in the direction of retardation rather than in acceleration.

4. *Changes in Personality:* Alteration in the general personality pattern has long been one of the most frequent qualitative findings in cases of organic involvement of the more anterior regions of the cortex. Symptoms reported in cases of frontal and temporal tumors and lesions are strikingly similar to the type of picture one finds in the general paretic patient. Infantile and puerile behavior, boastfulness, occasional delusions of a grandiose nature, immorality and asocial behavior are but a few of the changes which have been described. Although such changes are rarely noted in cases of unilateral frontal ablation, the case of bilateral frontal lobectomy reported by Brickner (12) is an excellent example of the type of personality alteration described.

Psychological studies of such manifestations have been confined wholly to alterations in the structural aspect of the personality character and have been almost entirely limited to the use of the Rorschach Inkblot Method. Other available tests of personality deal with the content rather than the structure of personality and are much more qualitative in nature.

Rorschach (108) makes little reference to the performances of patients with organic disease in the original monograph. His group of cases contained only 5 who were suffering from brain disorders and some of these appear to have been of questionable diagnosis. His observations on the performances of the patients are very limited and unorganized. Oberholzer (97) has long been interested in the Rorschach performances of patients with organic brain involvement and has studied epileptics and cases of traumatic cerebral injury.

The first concerted study of the personality changes in organic brain disorders was made by Piotrowski (105) in 1937. He obtained Rorschach records in 18 cases of organic cerebral involvement which were compared with the records in 10 cases with non-cerebral involvement of the nervous system and 5 cases of conversion hysteria. As a result of this study, Piotrowski singled out ten signs which he believed were indicative of cerebral organic damage and further stated that if six or more of these signs were present, there



was strong justification for a diagnosis of organic involvement of the cortex. However, it would seem that the generalizations of Piotrowski on the basis of this study should be accepted for the present with some reserve. As Harrower-Erickson (55) has pointed out, little is known of the nature or location of the brain damage in his cases; further, one does not know whether the patients were examined before or after operation. However, the value of Piotrowski's investigation in respect to its suggesting the application of the Rorschach test in a systematic manner to patients with cerebral damage cannot be minimized.

Nadel (93) attempted to apply the organic signs of Piotrowski in a Rorschach investigation of patients with frontal lobe disease. The experimental group consisted of 15 patients who had been diagnosed as suffering from lesions in either the left or both frontal lobes. The records of these patients were compared with those of 15 patients suffering from involvement of areas of the cortex other than the frontal region. The results demonstrate the presence of an average number of 5.1 of Piotrowski's signs in the group with frontal lesions as compared with an average number of but 1.6 signs in the control group records. Nadel further finds that 6 of these signs are of particular diagnostic significance. It appears that the signs postulated by Piotrowski are of greatest diagnostic significance where the organic involvement lies in the frontal cortex. The paradox inherent in an evaluation of the results of Piotrowski and Nadel lies in the fact that the former postulated the ten signs on the basis of a study of cases in which the damage involved all areas of the cortex while the latter found such signs predominantly confined to the frontal region. One would therefore deduce that Piotrowski's experimental group contained a large number of frontal-lobe cases.

The recent studies of Harrower-Erickson (55, 56) utilizing the Rorschach test in patients with cortical involvement are especially well organized and described. The records of the patients are compared with the "average normal" type of record, the patient group being divided in terms of the nature of the disease process, the location of the damage, and pre-operative and post-operative conditions. The experimental group consisted of 25 patients whose records were compared with the average normal record. The gross results indicated "restricted and constricted personality, extraordinarily uniform when contrasted with the variety found in the records of the normal subjects." When patients were compared with reference to the nature of the brain damage, no notable differences could be established. The rate of growth of the tumor could not be estimated on the basis of the Rorschach performance. Also, in contradistinction to the findings of Nadel (93), the location of the damage in the cortex did not appear to be a differential factor. However, the author states that further investigation is necessary upon this problem and is in progress. When pre-operative and post-operative records are compared, it is found that the latter more closely approximate the normal type of performance. This conclusion is consistent with the more general finding demonstrating more positive signs in the presence of pathological tissue than in the absence of brain tissue. The most significant positive findings advanced by Harrower-Erickson is that the Rorschach test was clearly able to differentiate between the organic performance and the performance of patients without organic involvement whose symptoms are clinically similar to those of the organic group.

Harrower-Erickson (56) also studied a group of 24 patients with focal epilepsy in order to discover the possible presence of a personality pattern specifically characteristic of such a disease entity. Earlier Rorschach studies had given rise to inconclusive and contradictory results. Guirldham (49) had studied 100 cases with varying types of epileptic conditions and concluded that there was no Rorschach pattern that could be regarded as typical of such a group of cases. Stauder (123), on the other hand, had found that Rorschach records of epileptics were unmistakably similar and that there were definite signs specific to such cases. It must be noted, however, that Stauder employed a



group of deteriorated epileptic subjects. Harrower-Erickson (56) had found that the Rorschach records of deteriorated epileptics and those of patients with focal epilepsy are quite different.

Harrower-Erickson's study involved 24 subjects, all of whom had undergone surgery for the removal of scar tissue. The author was able to compare pre- and post-operative records in 10 of these cases. The results obtained were compared with those of a group of patients with larger infiltrating lesions, a group upon whom craniotomy had been performed, and a group of deteriorated epileptics. The most striking feature of the findings in this investigation is the marked variability of the performances of the patients with focal epilepsy. There was no characteristic or specific personality picture and in general the results corroborate those obtained by Guirdham (49). Other positive findings are concerned with the problem of prognosis following operative procedure. There appeared to be certain indications in the pre-operative records of the patients which were somewhat correlated with tendencies toward post-operative improvement, but as Harrower-Erickson states, further investigation is indicated:

This makes one hope that such studies may make a contribution to prognosis, for if improved psychological capacity, as evidenced by the Rorschach test, is in itself an index of improved cerebral function, as is suggested by this study, this method may become a prognostic procedure for the selection of those patients who are most likely to be benefited, both mentally and physically, by operative intervention.

At the present time, investigations upon patients with brain involvement with the Rorschach test indicate that there are numerous problems still in need of further exploration. The limited number of systematic studies does seem to demonstrate clearly the potential value of this test with reference to the alterations in personality. The Rorschach test is a technique which subtly evaluates the structure of the personality. In the more extreme cases of organic brain disease, personality modifications are clinically obvious and do not require fine and accurate measurement. However, the possibilities which the Rorschach method offers with respect to the detection of personality deviation where clinical behavioral manifestations are not immediately apparent must be further explored.

5. *Changes in Psychomotor Tempo*: Because of the relatively high frequency with which qualitative studies of frontal and temporal brain disease observe alterations in the speed of thinking as well as motor behavior, one would expect numerous psychological investigations directed toward such psychomotor functions. Although, in addition, various techniques are available, there is a surprising dearth of such studies in cases of organic brain pathology. This may be due to the preoccupation with changes in the intellectual and affective spheres which have received most of the attention of investigators in the field.

Hunt, in her psychological examinations which were part of the study of the effects of pre-frontal lobotomy by Freeman and Watts (33), employed a group of tests which were almost exclusively measures of psychomotor tempo. Most of her tests were scored on the basis of speed of performance. Her results demonstrated that eight of the tests yielded reliable differences between pre-operative and post-operative performances. Of these eight tests, six were exclusively measures of the speed of performance. More specifically, she found that speed of arithmetical calculation, speed of cube construction, and speed of color naming were significantly faster after pre-frontal lobotomy operation. On the other hand, the rates of performance upon a paper formboard test, a cancellation test, and a substitution test were significantly slower after pre-frontal lobotomy. The results are therefore inconclusive with reference to the general problem of changes in psychomotor tempo after removal of frontal brain tissue. An analysis of the functions measured seems to suggest that performance is slower after operation when sustained attention and



recent memory functions are involved. There appears also to be greater impairment of speed when the formation of new associations are required.

Studies of performance test ability by Rylander (114) and Conkey (16) have been concerned with the accuracy and quality of the performance rather than with the speed. Despite the qualitative detection of easy fatigability in such cases, no significant studies on pure motor functions have been carried out. Studies of brain tumors and other lesions have yielded results with respect to psychomotor tempo in both possible directions. Some patients demonstrate an acceleration in motor behavior while others appear retarded. These changes appear to be related to the associated changes in mood since depression generally accompanies retardation while euphoria tends to be found in cases showing hyperactivity. Perhaps the direction of change which the mood and activity level of the patient will assume is related to some factor or factors in the personality make-up or development of the individual. If such were the case, the paradoxical results reported by Hunt with reference to psychomotor tempo might well be representative of the general findings which one may anticipate in organic cases. That is, some individuals will show hyperactivity with euphoria and restlessness while others will become retarded with depression of mood. A study of this more general aspect of this problem seems to be indicated and might well be approached in terms of motor and psychomotor investigations upon patients with organic brain disease.

6. *Disturbances in Perception:* Bender (4) has developed a test which measures the ability to perceive and reproduce a series of gestalt forms. This test has been administered to various groups of clinical disease entities including patients suffering from some form of organic brain involvement. Empirical results indicate that the patients with brain disorders encounter marked difficulty in the motor reproduction of these gestalt forms. Also, the errors made by such patients appear to be of a rather definite and constant type and differ from the errors made by the "functional" disease groups as well as from the performances of children. The defect is therefore believed by Bender to be in the nature of a pathological performance rather than any regression to a more infantile or ontogenetically lower level.

Bender feels that the errors made by the patients with organic brain involvement upon this test are due to some inherent inability to perceive the gestalt forms adequately. There is said to be some defect that may be explained in terms of the various laws of gestalt perception. Since the patient does not adequately perceive the forms, it would follow logically that there would be difficulty in reproducing them. However, there is a question as to whether the errors upon this test are actually due to an inherent perceptual defect or whether they are simply a function of some motor or apractic defect related to pathological involvement of the motor cortex. Also, fine tremors of various types are very common in organic cerebral disorders and may possibly account for much of the difficulty with this test. However, these reservations do not detract from the value of the test as a clinical device. Empirically, it does seem to differentiate the organic type of case from other clinical groups.

Harrower-Erickson (54) found a definite perceptual defect in patients with cerebral lesions. She employed the Rubin (112) profile-vase drawings. The experimental group consisted of 30 patients with unilateral lesions of the frontal, frontal parietal, and temporal regions. The performances of these patients were compared with those of a group of 30 normal control subjects. The test procedure involved the presentation of a total of seven drawings to each subject. Three of these were enhanced profiles, three were vases, and one was ambiguous. The subjects were merely required to state what they saw. A "normal response" was said to be a direct perception of the ambiguous figure as either a vase or a profile. The results demonstrated a striking difference between the patient and control groups. Of the normals, 90 percent gave "normal responses" as opposed to but 6.6 percent of such responses in the group with organic brain lesions. The patients



consistently failed to recognize the ambiguous figure as a familiar object even after correct perception of all the other figures. They frequently brought in new objects which they substituted for the vase or the profile. They showed marked rigidity and perseveration of perception in clinging to the figure which was first seen and also showed a strong tendency to be concerned with concrete details. Instead of stating the profile to be such, the patients tended to give it some definite name such as Roosevelt or Washington. None of these phenomena occurred to any notable extent within the normal group. From these results, Harrower-Erickson concluded that patients with brain lesions show a definite defect in the perceptual sphere. This is quite in keeping with the conclusions of Bender (5). The author points out the following implications of her findings:

The value of such findings would seem to lie in the fact that they may give us clues to certain qualitative differences in the experiences and behavior of persons suffering from cerebral lesions, differences which might well leave unaltered a quantitative estimate of the intelligence level, and might pass unnoticed in ordinary daily life and yet if recognized may enable us to reconstruct more accurately the changed psychological world resulting from changes in the brain.

More recently, Werner and Strauss (135) found that the perception of figure-background relationships of mentally retarded children with brain lesions was pathological and differed from that of children of normal intellectual development. In order to show that the perceptual defect was not a function of the low intellectual level, the performances of the mentally retarded children with brain lesions were compared with the performances of a group of matched mentally retarded children without organic brain disease and the latter group did not show pathological figure-background perception. The normal group contained 30 children while the two mentally retarded groups consisted of 25 children each. Four tests were employed, of which two were tachistoscopically presented and involved visual perception, one was a test of visuo-motor ability and involved the reproduction of a design on a marble board, and the other was a test of tactual-kinaesthetic perception.

The results demonstrated that the children with brain lesions consistently experienced difficulty in extracting the figure from the background. They tended to respond entirely to the background or were predominantly attracted by the background. This difference between the group with brain lesions and the retarded children without organic brain disease was consistent upon all tests involving visuo-motor and tactual-motor as well as visual perception. It should also be noted that this difference cannot be ascribed to the presence of gross motor defects in the children with brain lesions since children in whom such disturbances were discovered were excluded as well as those showing visual agnosia. It appears therefore that the children with organic brain lesions demonstrated an inherent perceptual defect which must be attributed to the presence of organic cerebral damage. However, the authors make mention of the possible relationship of the perceptual defect to heightened distractibility of attention resulting in preoccupation with aspects of the background as opposed to consistent selective concern and attention to the figure. The striking consistency with which Bender (5), Harrower-Erickson (54), and Werner and Strauss (135) have found disturbances in perceptual organization in cases of organic brain disease indeed indicates the uncovering of a valuable clinical tool with reference to the problem of differential diagnosis.

#### IV. SUMMARY AND CONCLUSIONS

There are three fundamental questions which arise in relation to the clinical value of systematic investigations of the psychological alterations in organic disease of the cerebral cortex. These might be stated as follows:

1. Is there a group of psychological changes which occurs with sufficient frequency and consistency to be considered as an "organic psychological syndrome"?



2. Can such mental symptoms be of any potential value in contributing toward the localization of the pathological process in the cortex?
3. Can an investigation of the mental changes contribute toward a knowledge of the nature of the pathological process?

A review of the descriptive or qualitative studies of the mental changes in organic brain disease enables one to hazard a reply to each of these questions.

With respect to the first question, it may be stated that there is a group of general and diverse mental symptoms which occurs with sufficient frequency and consistency to be considered at least tentatively as constituting a "frontal-lobe mental syndrome." Intellectual deterioration, memory defects, impaired abstract-thinking ability, loss of initiative, difficulties in sustaining attention, alterations in the general personality structure, and changes in psychomotor tempo and mood tone are particularly characteristic of tumors and other lesions of the frontal region of the cortex. These changes are less severe and less consistent in instances of ablation of frontal lobe tissue. These same psychological symptoms apparently occur frequently in temporal lobe involvement, especially in tumors and some types of progressive lesions in that area. However, it may be noted that mental symptoms in temporal lobe disease are apparently not as marked or consistent as in frontal lobe disease and also that the mental picture presumably develops later in the disease process than in the case of focal frontal-lobe involvement.

It is possible, therefore, that the mental changes cited above are related to frontal-lobe disease and that their appearance in certain types of focal temporal region disease is a result of secondary involvement of the frontal cortex by virtue of either increased intra-cranial pressure of a generalized nature or some type of progressive degenerative lesion implicating the frontal region. Goldstein (45) has stated that damage in any area of the cerebral cortex will eventually irradiate to the frontal region. However, qualitative studies of parietal and occipital disorders yield no mental changes similar to those observed in cases of fronto-temporal involvement. It appears, therefore, that the mental symptoms are of some value in the localization of the disease process within the cortex, being indicative of either primary or secondary involvement of the frontal cortex. This would seem to imply a positive answer to the second question posited above: the time of onset of the mental changes in the disease process has important implications for temporal-region localization in that a relatively late appearance of the mental syndrome would be suggestive of focal temporal-lobe disease. These conclusions are, of course, derived entirely empirically.

The third question asked is the most difficult and any positive statements must be considered as highly tentative. However, it is felt that some indication of the nature of the disease process may emerge from a study of the severity, as well as the number, of the mental symptoms which are present. Frontal lobe tumors and other focal lesions along with temporal tumors appear to give rise to the most severe and consistent mental symptoms and temporal lesions of a progressively degenerative type are next in importance. In the case of the latter, the psychological changes appear later in the disease process. Finally, it is found that the symptoms are consistently less severe and least frequent in cases of partial bilateral or unilateral frontal or temporal ablation.

The hypotheses of inter-lobular and intra-lobular transfer of functional ability have been suggested by various authors as possible bases for the absence of marked mental changes where cortical tissue has been excised. It is conceivable, as Brickner (14) has pointed out, that psychological function is



bilaterally represented within the pre-frontal cortex. It is further possible that representation of functional ability is of a generalized nature within the entire association area of any one frontal lobe. The process of transfer of psychological function within the pre-frontal cortex requires the integrity of the commissural fibres through the corpus callosum as well as the association fibres and may be thought of in terms of a gestalt-like mechanism of interacting nerve fibres. This process of nerve fibre interactivity is presumably disturbed and cannot be carried out adequately in the presence of pathological tissue in the frontal region, as evidenced in the severity and frequency of the mental symptoms in frontal tumors and other lesions of that area. It appears that only in the absence or excision of pre-frontal tissue is it possible for such a transfer of function to take place with the resultant mild psychological changes which have been observed. Psychological studies, however, have demonstrated that such a transfer of functional ability is hardly of a complete nature, although it seems sufficient to escape general qualitative and clinical symptomatic detection. Specialized test methodologies suggest the presence of certain apparently irreversible mental deficits following excision of pre-frontal tissue which may well be missed unless a specific controlled situation is brought before the patient. Such a definitely controlled situation is that of psychological test procedure. Also, such test methods have served to break down certain of the broad and more general mental changes qualitatively observed into more specific and definite functional defects.

The approach to the problem of the mental changes in organic brain disease through the media of psychological test techniques has been described as being of two basic kinds. Both types of studies are primarily concerned with the relationship between the frontal cortex and mental function. One approach has employed conventional or *unspecialized* tests of formal intelligence and general results indicate negative findings with reference to the presence of "general intellectual deterioration." Pre-operative and post-operative test comparisons upon patients undergoing excision of frontal tissue yield no gross lowering in the intelligence test scores following brain surgery. In fact, in some instances, a definite gain in the intellectual level has appeared following frontal ablation.

However, with the development and application of *specialized* psychological test procedures to this general problem, certain subtle but definite mental defects emerge. Such test development has consisted largely in an analysis of certain of the component elements of the so-called "general intellectual process" such as abstract thinking, memory ability, or judgment and comprehension. Other symptomatic and specialized tests have also yielded positive findings. Among these are the Rorschach, the Bender test of visuo-motor gestalt function, and tests of sustained attention. Such studies have been primarily applied in cases of partial unilateral frontal excision in which the qualitative studies have noted either mild mental changes or complete absence of any mental defects after surgery.

The conclusion seems warranted that specialized test procedures can and do reveal definite impairment in mental functioning in cases in which pre-frontal lobe tissue has been removed surgically, whereas clinical observation of a qualitative kind finds no psychological deficits in such cases. The presence of certain subtle irreversible mental defects points to the fact that the existence of any mechanism for the lobular transfer of psychological function within the frontal cortex cannot be visualized as a complete "regenerative" process. Certain mental functions suffer irreparable damage when frontal



tissue is removed, but such defects can be studied or detected only by means of a highly specialized and controlled type of situation. The principle contribution of psychological test procedures in this problem must lie in the subsequent development of specialized situations which would call forth and reveal impairment in mental functioning which escapes qualitative clinical detection.

At present, superficial study of the investigations utilizing test procedures reveals a somewhat confused picture. One must not minimize, however, the emergence of some consistent positive trends. The difficulties in obtaining adequate quantitative sampling at the human level in such cases along with the problems inherent in clinical diagnosis and localization must be recognized. However, despite the use of a great variety of tests upon all manner of organic clinical entities in an unsystematic manner, it has been shown that certain definite conclusions are possible from an organized survey of the field. The mental changes in organic brain disease appear clearly to embrace more than any single psychological functional sphere. Experimental investigation must proceed from numerous and different directions if the parts of the puzzle are to be joined together.

It is felt that experimental progress demands the satisfaction of two basic methodological considerations. First, it would seem that the primary and fundamental situation must involve comparisons between the test performances of patients with organic brain disorders and normal persons. Logically, one would expect to see the more obvious differences emerge in such a comparison. Then, one could proceed to a study of patients with respect to the problems of different types of brain disease and differential localization of brain damage with chances of attaining greater understanding and accuracy. Second, it is felt that specialized test development should be directed toward the various spheres of possible psychological impairment. The diverse nature of the mental defects qualitatively seen in organic cases must be totally explored with the use of specialized test techniques. The problem of mental alteration in organic disease of the brain cannot attain certainty and generalization in terms of a single test procedure. A battery of test techniques which will attack psychological functioning in the organic patient at every potential vulnerable point appears to be most advantageous. It is felt that one of the principle justifications for a review of this kind lies in its demonstration of the type and multiplicity of such vulnerable points of attack.

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# CERTIFICATION OF PSYCHOLOGISTS IN CONNECTICUT

KARL FLORIEN HEISER

*Hartford, Connecticut*

The war years are stimulating an awakening of interest among psychologists in the social role and applications of their science. It is difficult to imagine that they will quickly leave the arena of social problems and return to their preoccupation with academic teaching and theoretical research. It may be expected that many psychologists will maintain their interests in and contributions to the practical and social problems of our time.

Those psychologists who concern themselves with the results and by-products of this situation are inclined to see that the broader utilization of psychology is working in three directions:

1. An increase in the number of positions available to psychologists.
2. An increase in the number and proportion of college graduates who will seek their life work in psychology.
3. An increase in monetary rewards for psychological services.

While, in general, these tendencies may seem gratifying, they pose important problems for the profession and may be said to constitute the framework within which Connecticut psychologists have taken the steps, described below, toward the control and recognition of adequate professional standards.

The Connecticut Certified Psychologists Act, is as follows:

*State of Connecticut House Bill No. 400*

## AN ACT REGULATING THE USE OF THE TITLE 'CERTIFIED PSYCHOLOGIST'

*Be it enacted by the Senate and House of Representatives in General Assembly convened:*

*Section 1. Board of examiners.* On or before July 1, 1945, the governor shall appoint three psychologists whose qualifications shall be not less than those specified in subsections (a), (b), (c) and (d) of section four of this act, to be members of the board of examiners of psychologists, one to hold office for one year, one for two years and one for three years, from said July first; and annually thereafter he shall appoint for a term of three years, and until his successor is appointed and qualified, a psychologist, certified according to the provisions of this act, to replace the member whose term expires. Each such member shall be an elector of this state and shall have engaged in the practice of psychology for at least five years. The governor shall designate one member as chairman of said board of examiners and shall fill any vacancy therein by a certified psychologist for the unexpired portion of the term. He may remove any such member, after notice and hearing, for incompetence, neglect of duty or malfeasance in office. Two members of the board shall be a quorum. Each member shall receive his necessary expenses incurred in the performance of the duties required by this act.

*Section 2. Report. Office. Regulations.* The board shall report in writing, annually on June thirtieth, to the governor. Such report shall include the names of all psychologists to whom certificates have been granted as provided in sections four and five of this act, any cases heard and decisions rendered in relation to the doings of said board of examiners, the recommendations of the board as to future policies, the names, remuneration and duties of the employees of the board and an account of all moneys received and expended by it. Each member of the board shall review and sign such report before its submission to the governor. The principal office of the board shall be in Hartford but it may meet or conduct any of its business at any place in this state. The board may em-



power any member to conduct any proceeding, hearing or investigation necessary to its purposes.

*Section 3. Registration of educational institutions.* The secretary of the state board of education shall register any educational institution if he approves the standards maintained by it and its requirements precedent to the granting of degrees presented for a certificate as a psychologist. In making such a determination, said secretary shall be guided by the advice of said board of examiners and any other factors he considers material to his decisions. Such decisions in regard to any institution may be reconsidered at any time.

*Section 4. Certification.* No person shall use the title "Certified Psychologist" in this state without a certificate granted by said board of examiners and signed by each member thereof. Before granting any such certificate the board may require any applicant therefor to pass a written examination in psychology to be given at such time and place and under such supervision as the board prescribes. Such applicant shall pay a fee of fifteen dollars and shall satisfy the board that he (a) is at least twenty-one years of age; (b) is of good moral character; (c) is a citizen of the United States or has legally declared his intention of becoming one; (d) has received a degree of Doctor of Philosophy in psychology from an educational institution registered as provided in section three of this act, or, in lieu of said degree, a doctorate degree in education from an institution so registered if it is the opinion of all members of the board that the training required therefor is substantially similar; (e) has had at least one year's experience of a type satisfactory to the board in the practice of psychology and (f) has not within the preceding six months failed an examination given by the board. The board shall grade the examinations returned by the candidates and shall keep them for at least one year. Any unsuccessful candidate may, upon written request to the board, see his graded paper.

*Section 5. Certification under special conditions.* The board may grant a certificate upon payment of a fee of fifteen dollars to any person who applies therefor within two years from the passage of this act who meets the requirements of subsections (a), (b), (c) and (d) of section four hereof, provided the board may waive either an examination or the requirements of subsection (d) if it deems such action to be in the public interest, who is qualified by experience to practice psychology and who had been engaged in such practice at least three years at the time of the passage of this act. The board may grant a certificate without examination to any person who at the time of application is licensed or certified by a similar board of another state whose standards, in the opinion of the board, are not lower than those required by this act, or who has been practicing psychology in another state for at least three years and is able to satisfy the board that to grant him a certificate would be in the public interest.

*Section 6. Suspension or revocation of certificate.* The board may revoke any such certificate or suspend the same for a definite period not to exceed one year if the certificate holder has been convicted of a felony or has been found by the board to have employed fraud or deceit in obtaining his certificate or to have acted negligently or wrongfully in the conduct of his profession. After three years from the date of a revocation, an application for reinstatement may be made to the board, and it may, upon favorable action by the majority of its members, grant such reinstatement. Notice of a contemplated revocation or suspension, of the cause therefor and the date of hearing thereon, shall be mailed to the holder of such certificate at his last-known address at least fifteen days before the date of such hearing. No certificate issued under this act shall be revoked or suspended without such hearing, but the nonappearance of the holder of such certificate, after notice, shall not prevent such hearing. Any person whose certificate has been revoked or suspended may, within thirty days after such revocation or suspension, appeal therefrom to the superior court for Hartford county. Such appeal shall be accompanied by a citation to said board to appear before said court. Such citation shall be signed by



the same authority and such appeal shall be returnable at the same time and served and returned in the same manner as is required in the case of a summons in a civil action. No such appeal shall operate as a supersedeas to such revocation or suspension.

*Section 7. False representation.* Any person not certified as provided in this act who designates himself or his occupation by the words "certified psychologist," or by any other term which implies that he is a certified psychologist, shall be fined not more than five hundred dollars. The board may investigate any alleged violation of the provisions of this act.

*Section 8.* This act shall take effect from its passage.

The Connecticut Certified Psychologists Act is the product of discussion, planning and cooperation between members of the Connecticut Valley Association of Psychologists and the Connecticut State Psychological Society over a period of 16 months. The following discussion is limited to the consideration of the merits of the Connecticut legislation and of the practical steps taken to secure its enactment. Since such legislation is probably desirable in other states, it is hoped that our experience and methods will be helpful.

In the preliminary discussions it was decided that the following objectives should be sought:

1. Statutory recognition of professional standards and training of psychologists.
2. The general recognition of the doctorate as the professional degree.
3. A means by which employers and the public might better discriminate among psychologists, at least in respect to professional knowledge and training.

These decisions were quite an accomplishment in themselves, simple as they seem. This will be recognized by any one who joins a group for serious discussion of professional problems.

Many psychologists prefer the alternative, to statutory regulation, of control by professional groups themselves. Such regulation already exists in the standards for admission to our various professional organizations. Such standards are necessary within the profession, but they do little for the public or for the individual psychologist in his dealings with the public.

While no one would claim that the Ph.D. is a guarantee of professional competence, it is believed by the majority that it denotes a standard of training and ability that should be achieved by all who wish to assume professional responsibilities in their relations to the public.<sup>1</sup> This may seem unfair to those hundreds of people who are giving satisfactory services yet have only their Master's degree, but it is felt that, in the long run, both the public and the profession will benefit from the higher standards, used not as a means of exclusion and restriction of the profession to a limited number, but for the expansion of the demand for psychologists through the demonstration of their high value.<sup>2</sup>

<sup>1</sup> The Connecticut statute provides that this requirement can be waived during the first two years the statute is in force in the case of psychologists of established standing who have had three years of professional experience.

<sup>2</sup> It is the writer's opinion that, until the profession has come to general agreement on the standards and classification of psychological services, such titles and positions as psychometrist, psychological examiner, and assistant psychologist should be discouraged and that college departments should cease advising their young graduates that they may go into the interesting field of mental testing with the M.A. degree or less. It is neither good science, nor good professional practice for such persons, in the name of psychology, to report test results to employers, parents, etc., who are seldom able to make proper use



The decision to limit certification to basic training and general ability rather than to attempt to set up standards for certification of several areas, such as clinical and industrial psychology, was due to the lack of professional agreement on duties, necessary training and standards of such specialists.

With these objectives agreed upon, the next steps were the construction of the statute itself; the decisions as to just what a bill should contain. These steps were taken by the discussion of Britt's "Model Act"<sup>3</sup> and of several constructions by members of the local committee. It was decided that the bill should provide for:

1. *Certification rather than licensing.* (See ¶. 1 below.)
2. *An independent examining board with authority to issue and revoke certificates in the name of the state.* (See ¶. 2 below.)
3. *A standard of training and experience based upon the doctorate.* (See ¶. 3 below.)
4. *A method of accrediting graduate schools whose degrees may be presented in application for a certificate.* (See ¶. 4 below.)
5. *A penalty for violation of the act.* (See ¶. 5 below.)

1. It was agreed that the status of psychology does not justify a strict definition of psychological practice, competence or training, and that neither professional nor lay agreement could be secured in support of legislation which would deny the practice of psychology to those without a license. The approach to the control of standards must be made, therefore, through legislation which sets a good standard, the merits of which the profession and the public may, in time, appreciate. The Connecticut Act, therefore, is comparable to those which cover accountancy and distinguish between Certified Public Accountants and others, without restricting the practice of accounting.

2. There was strong agreement that the control of licensing be in the hands of professional psychologists responsible only to the Governor. There was some feeling by others that certification should be done by the Commissioner of Education who could appoint the examining board and regulate its policies in compliance with the law. This opinion was based partly on the fact that the Department of Education already has a certification system for school psychologists, psychological examiners and examiners in training who handle testing and special problems in the schools. Although the relative isolation of most psychologists from those who are engaged in psychological practice in schools and other agencies should be deplored, it was felt that the independent determination of standards by the professional group still is necessary. The encouragement of cooperation and discussion of mutual interests between the professional groups and those engaged in practical work in schools and industry should be undertaken, but it is a separate problem.

3. The standard of training based upon the doctorate was determined upon with general agreement largely because the Connecticut State Psychological Society, which undertook the responsibility for getting the legislation passed, has the Ph.D. as a requirement for its own membership. The state society includes 55 of the 60 psychologists in Connecticut who are qualified for membership. Altogether, about 120 persons in Connecticut are listed as associate or full members in A.P.A.

4. The accrediting of graduate schools whose degrees may be presented in application for certification is an onerous task. Though the examining board might undertake

of them. Psychologists are not to be blamed for the over expansion, commercialization and weaknesses of the mental testing movement, yet they should not have been so ready to use it as a means of placement of thousands of young majors who are eager to be of social service in this limited vocational field.

<sup>3</sup> Britt, S. H. Model "Certified Psychologists' Act." *J. cons. Psychol.*, 1939, 3, 123-127.



this responsibility, several good reasons were advanced for having the accrediting handled by the State Department of Education which already provides this service for a few other professional groups. The agreement on this procedure was secured in conference with the Commissioner of Education and the Act as passed delegates this power to the State Department of Education with the advice of the examining board. This policy is a desirable one for Connecticut, but may not be advisable in some other states. The determining factors should be whether or not (1) the State Department of Education appreciates and is committed in practice to high professional standards; (2) greater professional and public confidence may be had in the certification procedure, and (3) it aids in the passage of the act by the legislature.

5. It was agreed that if certification is to mean anything there must be a real penalty and provisions for enforcing it in cases of violation of the Act. The size of the penalty, (from suspension and revocation to a \$500 fine, in the Connecticut Act), should depend upon precedent in other similar statutes, and upon the seriousness of violations and upon the respect which may be gained for certification. Too small a penalty would indicate that certification is of little significance.

Having agreed upon the provisions of the Act, the state Society appointed a five member legislative committee charged with getting the Act passed by the legislature. The first step was to secure the endorsement of 125 prominent citizens in the fields of government, welfare, medicine, industry and science.

As a wise precaution, the bill was taken to a member of the staff of the Statute Revision Commissioner, thru whose office all bills go for editing and examination, for help and advice in the actual wording of the bill so that its language and construction would be according to precedent and without irregularities that might be picked upon by any legislator who opposed the bill. Since psychologists are seldom experienced in legislative procedures, the desirability of this step cannot be over-emphasized.

These endorsements, together with a copy of the bill and a letter of explanation from Walter R. Miles, president of the state Society, were sent to the Legislative Council, a body of legislative leaders of both parties who develop and present what they consider to be the most important and urgent legislation. This step was taken to plant the idea in the minds of a few political leaders and to forestall their possible opposition to a measure of which they had no understanding, rather than in the hope that they would themselves undertake its passage as an important bill. As expected, the Legislative Council politely expressed its regret that it could not undertake this bill because of prior and more pressing legislative matters, but it looked with favor upon the objectives of the bill and suggested that a representative or senator might be willing to present it.

A representative with several terms of legislative experience, supported by both parties in his constituency and with a reputation for good judgement and support for legislation in the public interest was asked to present and support the bill. After study of the bill, he became in hearty agreement with it and gave it conscientious and consistent support.

Upon introduction and reading in the House of Representatives, the bill was referred to the Committee on Licensed Occupations, a group made up of members of the House and Senate. Since the passage of most legislation is determined in committee, all efforts were concentrated upon getting approval of the 17 committee members, especially the two chairmen. Letters of explanation and endorsement were sent by several psychologists to the committee, and the chairman of the state Society's legislative committee called upon several committee members personally. At the public hearing on the



bill, Representative E. O. Smith, who presented the bill, gave it strong endorsement and presented the signatures of the 125 endorsers. Three leading psychologists were prepared and spoke in favor of the bill. They presented in simple and brief language the merits of the legislation. Many more psychologists were present, and it was pointed out that they would be glad to speak in favor of the bill, but would not do so in the interest of conserving the committee's time.

The problem of getting a favorable hearing is very important and crucial. Psychologists and legislators speak a different language. In speaking to a legislative committee, the psychologist must remember that he is speaking to an intelligent group which, however, contains very few members who have had college training and probably none who have as much understanding of scientific psychology as the college student after his first week in the elementary course. Yet, in a few minutes time, the psychologist must present his profession in such a way as to engender an intelligent point of view and to avoid quibbling and questions for which there is no feasible answer in such a situation. The psychologist must be prepared for questions on psychoanalysis and he must remember that in the statutes of most states, when mentioned at all, he is classed with faith healers and spiritualists!

After the committee hearing, the usual procedure is for the committee to discuss a bill and to vote to report it favorably or unfavorably. It is frequently the case that a bill which is controversial or which has little public support, or which seems insignificant is held in committee without action. Or a committee may wish to amend a bill, in which case its proponents must be ready to give quick consideration to the proposed amendment and must be delegated with limited authority to decide between amendment of the bill, possible defeat, or support of the original wording. The Connecticut bill was held for two months without action by the committee. Finally objection was taken to the provision that the Governor appoint the examining board from a list of psychologists nominated by the state Society. This objection was quickly met by rewriting the first section of the bill and by discussion with the committee chairmen. The bill was brought up for vote the next day and was unanimously reported favorably to the House. When taken from the calendar for action, three days later, the psychologists in the gallery held their breath while the Licensing Committee chairman, who moved the bill's passage, eulogized the profession and said that this bill would not conflict with any other professions as the psychologists "just looked after ventilation and industrial problems and administered drugs, etc." The bill passed the House!

The following week the bill came up for vote in the Senate where its proponent explained that "psychiatrists treat the body while the certified psychologists would deal only with the mind!" On the vote to pass, the "ayes" had it.

Since the signing of the bill by the Governor seemed probable, the state Society polled all persons listed by APA in the state to get their preferences for membership on the examining board. The Governor signed the bill on July 19, 1945 and the six most preferred names were sent to him as the Society's suggestions, of whom the Governor appointed Dr. Marion A. Bills, Dr. Karl F. Heiser and Dr. Walter A. Miles as chairman.

While the act will not of itself raise and insure high standards of psychological work in Connecticut, and while alternative and more specific legislation should be considered, it is believed that it represents the best and most feasible step for the present. Elsewhere, e.g., New York, psychologists have achieved definition of standards through such acts as those which cover authority to commit to state institutions. In some states it may be felt that legislation should



distinguish between different grades or levels of professional competence or should define and set standards in a limited field such as clinical psychology.

It is the writer's opinion that the Connecticut Act is a desirable step, on the basis of which it should be relatively easy to pass future legislation requiring that psychologists pursuing certain functions shall be certified psychologists.

As a result of experience, the following points seem worthy of mention for their possible value to legislation-minded psychologists in other states:

1. At least a year should be spent in committee work and discussion among all who are currently recognized as psychologists.

2. There should be a recognized state-wide organization to sponsor and support legislation.

3. Discussion and debate should not be prolonged in the attempt to satisfy everyone. Approval by 75 per cent of those concerned is probably sufficient for proceeding, if they are in active, informed agreement.

4. A special small committee should be given responsibility and authority within limits set by the state group to decide upon particular legislative procedures. Members of this committee must be willing to write letters and able to "make friends and influence people." Personal contact with key legislators is essential.

5. Some support from outside the profession is probably necessary.

6. A clear exposition of the public benefit of the legislation, rather than its value to the profession, must be given.

7. The act should be so drawn that its operation (i.e. collection of fees for certification) will provide sufficient income to defray all expenses.

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## NOTICE

### BUSINESS MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION Columbus, Ohio, December 27-29, 1945

A business meeting of the American Psychological Association will be held December 27-29 at the Fort Hayes Hotel, Columbus, Ohio. Members of the new Council of Representatives, and officers of the various divisions will meet to plan the organization of the divisions and to transact other business. Several of the working committees of the APA also plan to meet at the same time. There will be no program of papers, but any members of the APA who are interested are invited to attend meetings of the Council. Reservations at the hotel may be obtained as long as they are available from DR. DAEL WOLFLE, *Executive Secretary, 2101 Constitution Avenue, Washington 25, D. C.*



# PSYCHOLOGY AND THE WAR

Edited by

DONALD G. MARQUIS

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## NAVAL AVIATION PSYCHOLOGY. I. THE FIELD SERVICE ORGANIZATION

JOHN G. JENKINS

*Commander, H(S), USNR*

During the period that has elapsed from the summer of 1940 to date, more than 100 psychologists have served under the cognizance of the Aviation Psychology Section of the Navy's Bureau of Medicine and Surgery. At the present time, approximately 90 names appear on its roster.

In describing the activities and accomplishments of this group, it is essential to point out that no single homogeneous function for the entire roster has ever existed. Although all the above personnel were originally procured to aid in a program of selecting aviation cadets, differentiation of function was quickly established. As time went on, four more or less clearly demarcated functions arose, each served by its own group of aviation psychologists. These are as follows: 1. The field service group, 2. The procurement and selection group, 3. The special services group, and 4. The central research groups.

It is planned to describe each of these groups in a separate article, noting certain general outcomes achieved by the activities of the group in question. Detailed and specific discussion of outcomes and techniques will have to await the further development of policy in this regard by the Navy Department.

*The Field Service Organization.* The status of the field service organization in 1941-42 may be briefly stated. A few psychologists had been procured by



the Bureau of Medicine and Surgery for assignment to training facilities under the conviction that they could be of help in giving tests "and in other ways." The test program, to be described in a later article, was definite; and it had representation within the central structure of the Bureau. The "other ways of being useful" had not been thought out; they represented little more than a conviction that psychologists, since they dealt with human behavior, must be able to do something besides administer tests.

The psychologists commissioned during the earlier years\* of the program found themselves in a thoroughly amorphous status when they reported for duty. They arrived at peripheral training activities (pre-flight schools, flight preparatory schools, primary training bases, gunnery schools, etc.) unable to define their own place in the military organization and unable to find anyone else who could define it. The administration, scoring, and interpretation of tests took at most a few hours out of a working week. The rest of the time they were free to "do whatever a psychologist did." Since the Commanding Officer ordinarily had no idea what psychologists could do—and since the psychologists ordinarily had little idea what their local training unit was trying to accomplish—the first weeks on duty were commonly more or less traumatic.

The story of the  $3\frac{1}{2}$  years of wartime development offers much evidence that psychologists are a relatively tough breed. Almost without exception they survived this initial trauma and began to learn enough about the function of their local organization to see where their training and point of view could be of unique service. Frequently this exploratory period was begun by accepting any task which would bring them into closer contact with the cadets and with the training procedures. Aviation psychologists volunteered to serve as Records Officers, as Bond Allotment Officers, as Welfare Officers, and, in various guises, as Personnel Officers. They taught classes in subjects that were definitely non-psychological, such as navigation and "Essentials of the Naval Service." Almost to a man, they discarded any worry as to whether a given task was appropriate for a Ph.D. or for a psychologist and began to weave themselves firmly into the local fabric. In many cases, they attended a full syllabus of courses in which aviation cadets were registered, simply to gain improved insight into the problems the cadets had to face.

Let it be said again that they did this with a minimum of central guidance and instruction from any source. There was a central administrative authority. Representatives of this authority made such visits to the various training facilities as the situation permitted. With such a large number of training centers, however, and with a small number of representatives of central administration,

\* In a recent volume, E. G. Boring dismisses psychological activities in the Navy with the statement that "The Navy, though starting later than the Army, developed a similar program of classification and training under the Bureau of Naval Personnel." (Psychology for the Armed Services, National Research Council, 1945, 18.) In so doing he ignores the fact that more than 200 psychologists were commissioned under the auspices of the Bureau of Medicine and Surgery, divided approximately equally between programs in neuro-psychiatry and aviation psychology. He also ignores the fact that the program of commissioning psychologists was begun in the Navy as early as July of 1940, followed by calls to active duty in that same year. Since the volume in question purports to offer a review of psychology in the Armed Services, it is to be regretted that the author failed completely to inform himself regarding a program which involved approximately 20% of the 986 psychologists named as being in uniform and which was actually one of the first to get under way.



these visits were usually supportive rather than directive in function. Correspondence was permitted and what could be accomplished by writing received due attention. The main responsibility, however, rested squarely on the shoulders of the local psychologist; and the credit for accomplishment should be apportioned accordingly.

At the conclusion of the war, the record speaks for itself. Psychologists are at work in a wide variety of aviation training facilities. At times all have suffered somewhat from the exigencies of the war. In certain localities, a change in cognizant officers has seen the psychologist displaced from a position of high importance which he had earned by his own efforts. Sometimes this has been temporary, as the cognizant officer proved flexible enough to realize that new functions had appropriately accrued to a type of specialist hitherto unknown in the Navy. Occasionally the situation has not improved during the tenure of a particular officer. In the main, however, the trend had been unmistakably clear. In the main, the psychologist has earned for himself a unique position as a professional man essential to the program for the training of naval aviators and the personnel serving aloft with them.

It is to the credit of the Navy, as well as the psychologists, that this is so. Since we have reached a postwar, "now-it-can-be-told," stage, it may be said that many of those who accepted commissions, did so with considerable misgiving. All had heard tales of Service bureaucracy, or Service inflexibility, and of a dogged adherence to the traditional and the conventional. Naturally, these tales were not without foundation; there are stupid men in uniform as well as on university faculties. On the other hand, the record speaks for itself. Aviation psychologists could not have achieved their present status unless their potential value had been appreciated by men of high intelligence, keen insight, and good faith in positions of importance throughout the naval organization.

In delineating the functions the aviation psychologist obtained through four years of evolution, the writer is constrained to point out that no small number of the psychologist's activities grew as much from his training in orderly thinking as they did from any training peculiar to psychology. Thus one man earned for himself a place of importance on an Aviation Safety Board. His Commanding Officer described his function by remarking that he was the "Thinking Member of the Board." His training in thinking in non-magical terms was a source of continuing interest to an earnest group of intelligent men who were unaccustomed to the rigorous demands of research intellection.

Another Aviation Psychologist—to limit the exhibit to two cases in the interest of space alone—finally achieved a place from which he was asked to review critically a local program of specialized training for aircraft gunners. The program suffered badly from over-intellectualization; it lacked integration of its component unit-courses; and it labored under a non-distributive system of grading. Almost single handed, the officer in question was able to bring these things up for review. His critical thinking was offered in the best tradition of Alexander Pope, with many "things unknown proposed as things forgot." Appropriate changes were made. More important, they were made in ways which gained firm local support from the training officers involved. To round out the picture, it may be remarked that a second school requested the services of this psychologist, with the result that he was able to repeat the entire performance at a school located some 5000 miles away from the original locus—and with equal success.

The selection of two examples should not be taken to imply that training in orderly thinking proved to be of value only in isolated instances. It is eternally



to the credit of the many graduate schools represented in the roster of Naval Aviation Psychologists that thinking of this type molded local operations in so many different localities.

A second contribution is as loosely tied to the peculiar nature of psychology as is the first contribution named above. Psychologists are trained in quantitative thinking, often in the form of statistical analysis. It has been a stimulating experience to many of our group to watch intelligent Navy officers, themselves untrained in quantification, learn how beautifully the simpler statistical methods can point a precise finger where unguided native intelligence provides only a formless suspicion that all is not well. There has, indeed, been little need to "sell" statistics; the problem has ordinarily been that of pointing out the inherent limitations of statistical analysis, once a case has been made for its use.

The non-statistical individual, after all, finds himself pretty helpless when confronted with a report which states that white horses eat more than black horses. He would like to invoke the aid of the statistician but suffers from a common phobia that statistics involves only an incomprehensible type of meretricious magic. Once he has been shown the results of computing total equine populations according to albedo and establishing per capita consumption, he feels himself enriched. The local psychologist has been wise in his approach here. He may have donned the black robe and done inverted factor analysis behind the doors of his own office, but he has presented his final outcomes in terms so simple that the auditor could check the results, if he wished, by personal re-computation.

As the writer reviews the contribution of these Naval Aviation Psychologists he is impressed by the fact that training in orderly thinking and training in quantitative thinking have bulked large in moving them towards positions of local responsibility. To say this is not to deride their contributions as psychologists; it is rather to remark that graduate training over the country as a whole cannot be as impoverished as certain alarmists would have led us to suppose. Psychology may or may not be a science. It must be said, however, that a group of men trained in this discipline have shown themselves to be capable of attacking practical problems in a way that befits the scientist!

On the more peculiarly psychological side, the local contributions of these men have clearly overridden any doctrinal differences between presumptive "schools" of psychology. This is clearly reflected in the similarity of developments in widely separated training units, developments that took place in all but complete isolation from knowledge of procedures in other training areas. The exhibit contains some suggestion that the common core of psychological knowledge and technique is more effective in meeting practical problems of human behavior than are the preachments of any particular point of view.

At most training activities the Aviation Psychologist spent much of his time as a student-counselor. Since he was dealing with a group of young men highly selected for physical and presumably mental health, it is not surprising to find that his problems closely paralleled those of the student-counselor at a typical university. The aviation cadet was confronted with a curriculum containing a wide variety of subjects. Especially during his pre-flight days, he presented the usual gamut of problems that arise when young men must learn from books, from lectures, and from demonstration. Here the psychologist felt thoroughly at home. When his suggestions were accepted, the recipient often had the astonishing experience of discovering that they really worked. This was hardly detrimental to the status of the "Student Advisory Officer"—a common designation for the local psychologist.



Success in dealing with problems of study-technique usually led to widened student-contacts, characteristically involving requests for aid in meeting personal problems. These tended to run through the usual catalog of the difficulties encountered by undergraduates. Families presented the types of problems that are always presented by families. A restriction against marriage during the duration of cadet-status brought up more acutely the emotional disturbances of post-adolescents facing an adult world. No small number of cadets concerned themselves with problems of postwar vocational placement or educational planning. Some merely wished to obtain attentive ears for their efforts to think through the meaning of a war which had received but little explanation in official circles. The psychologist faced here a local responsibility and a local opportunity of genuine social significance. Almost without exception, he faced it with the conviction that he was dealing with more than temporary problems or transient values.

In a system which affords an unusually high ratio of instructors to students, it is hardly surprising that the Naval Aviation Psychologist found himself frequently concerned with the student-instructor relationship. Only rarely were the instructors professional. Frequently the instructors themselves were recent graduates of the course they were now required to teach. Instructors' Schools had been established, but these ordinarily laid great stress on reviewing subject matter, with little if any attention to method of teaching. Thus the psychologist found himself confronted with a rich field for exploration. And again he made contributions which will last many years after the final cessation of hostilities.

As one example of an orderly approach to this problem, several independent attempts were made to develop workable rating-scales for flight instructors. These were viewed initially with a certain amount of suspicion. Once it had been demonstrated that these blanks were to be used as the basis for personal improvement, rather than for official disciplinary review, however, the way to acceptance was open. When standardization was finally made through central research and review, there was a steady procession of instructors through the office of the aviation psychologist. There they were given access to anonymous summary of the estimates placed upon them by their students. The psychologist stood ready to discuss the correction of weak point in terms of his accumulated experience. The records contain enough cases of successive improvements of ratings on specific issues to demonstrate that many instructors are willing to improve when made aware of their weaknesses and informed of avenues of improvement.

Not infrequently these contacts provided excellent opportunities for the discussion of problems in learning and training which lay outside the areas covered by the rating-scale. Often these contacts were greatly broadened by the fact that the psychologist offered himself as a guinea pig for flight-instruction. By serving as a flight-student himself (within the bounds of Navy legislation) the psychologist not only gained a closer liaison with the instructor, but he very greatly enhanced his knowledge of the training-materials with which he had to work. It may also be remarked that his appearance on the flight line in the humble status of student-pilot did not in any way diminish his acceptance at the hands of the aviation cadet.

It would be patently unfair to give credit to the aviation psychologist and not to mention the flight instructor. Typically the instructor was either a recent graduate of the training system or a civilian pilot converted by an abbreviated course into a Navy instructor. Tradition had it that his job was bore-



some to an extreme. He was warned ahead of time that he would grind out dull primary maneuvers in a "Yellow Peril" while his luckier fellows fought stirring duels with the enemy in fast and maneuverable military aircraft. He went more or less unrecognized, on and off the training base. Despite this negative setting, he was typically interested in his students, eager to train them properly, and amenable to suggestions when properly addressed. The psychologists in the field organization have been quick to come to his defense whenever they have detected any attempt to class all or most flight instructors as dull, unmotivated, and inherently resistant to change.

In the Instructors' Schools, the contribution of the psychologist followed predictable lines. Beginnings were humble—a lecture on principles of instruction, in which he was given a free hand. As he gained in experience, it was possible to illustrate his points by means of adequate and appropriate references to flight training, rather than to learning in general. The work was assigned increasingly larger proportions of the available time as it demonstrated its significance to those involved in wartime flight instruction. In at least two widely separated schools, the time assigned to the psychologist comprised the largest single area in the curriculum, by the time the war ended.

Locally constructed examinations become another concern of the psychologist. In the flight training program, the concept of centrally developed examinations was early put into force. Competent men were brought in directly from civilian agencies; and these men did a noteworthy job of bringing order into a heterogeneous and non-distributive examining system. In addition to such standardized examinations, however, there remained various local examination procedures. In many schools, accordingly, it fell to the aviation psychologist to demonstrate the practical significance of reliability, of range, and, upon occasion, of validity. It was ordinarily an absorbing procedure.

It is not possible, within the limits of this article, to review the wide variety of psychological duties which occupied these men at the end of the war. Due to the local autonomy which characterizes Navy activities, their accepted duties varied widely from place to place and from stage to stage of the training program. In the main they were concerned but little with selection, being mainly involved in problems of training and learning. In certain places this major concern led them over into detailed studies of local morale and of the factors determining local morale. In others it led over into improvement of local record-keeping to the end that records should be sign posts pointing toward improvement in procedure rather than epitaphs on the graves of defunct ways of doing. At its very best, the attack on training finally made the local aviation psychologist the technical adviser on training methods with direct access to those responsible for the local administration of a training program.

In sum, psychologists who were first brought in with the vaguely formulated idea that they could help with selection "and other things" had, by the end of the war, demonstrated that they have a place of practical importance in the administration of a program for training flight-personnel. They have done so in circumstances which gave them maximum local opportunity with minimum central direction. Except in rare instances, they have had to work on their own initiative and on their own responsibility. The present placement and labelling of these officers supplies the best measure of the extent to which they have justified the best efforts of the civilian graduate groups which gave them their peacetime professional training.

It will not detract from the record of psychologists in wartime to state that the high level of performance of civilians-in-uniform has made a lasting im-



pression on the Navy. The bankers who became shotgun instructors took their work seriously and, in the vast majority of cases, did their level best to turn out good aircraft gunners. The English professors who were transformed into Air Combat Intelligence Officers performed faithfully and well under heavy strain. Officers in the permanent naval organization have been genuine and sincere in their repeated public statements in praise of the way in which the vast bulk of Reserve Officers have accepted discipline and carried on in novel assignments with good spirits and high effectiveness. It is good to report that the profession of psychology has not suffered by comparison with the performance of other essentially non-military groups.

Since the group described in this article was definitely a service organization rather than a research organization, the reader may well ask what has come out of it all, now that the war is over. Well, at the very least, a conviction on the part of the permanent naval organization that the aviation psychologist has a regular and significant place in Naval aviation training. This is attested by the arrangements now being made in the Bureau of Medicine and Surgery to establish a permanent program in Aviation Psychology—a development unthought of, five years ago.

More important, perhaps, has been the growth within the Naval organization of a widespread awareness that the psychologist has specific techniques, peculiar to his own profession, which have proved of value in meeting practical problems in flight training. In concrete form these are reflected in residual changes in the flight training syllabus and in the procedures by which the syllabus is implemented. True enough, some of these changes will undoubtedly be lost through later administrative changes. A large operation, involving thousands of men, does not readily accept change nor readily retain it. Not even the most pessimistic observer would, however, be inclined to deny that the residual changes are sufficient to afford a solid basis for later developments.

It would be quite fair to all concerned to say that the good fight has only begun. Unless our profession loses contact with the Navy during the peace ahead, it will not again be necessary to demonstrate that psychologists can contribute significantly to the effectiveness of flight training. The energies hitherto devoted to that necessary step may now be diverted to the broader task of demonstrating the soundness of specific changes in flight training procedure which research-minded psychology would recommend. The field service organization described in this article has made a splendid beginning. Full realization of the possibilities ahead can be achieved only through the integrated efforts of the profession as a whole.



# PSYCHOLOGICAL TEST CONSTRUCTION AND RESEARCH IN THE BUREAU OF NAVAL PERSONNEL:

## VALIDITY OF THE BASIC TEST BATTERY, FORM 1, FOR SELECTION FOR TEN TYPES OF ELEMENTARY NAVAL TRAINING SCHOOLS<sup>1</sup>

STAFF OF THE TEST AND RESEARCH SECTION

*Training, Standards and Curriculum Division,  
Bureau of Naval Personnel*

The United States Navy Basic Test Battery was developed for use in the selection of enlisted personnel for assignment to naval training schools where they would be taught to perform such specialized technical Navy jobs as the operation of radar equipment, the upkeep and repair of Diesel engines, or the handling of the fire control apparatus on ship's guns. A previous article described the development of the tests of the battery and reported the results of a number of special statistical analyses: test reliabilities, intercorrelational studies, factor analyses.

Since the first form of the Basic Test Battery was placed in operation in June 1943, a continuing program of validation studies has been carried on to insure that the tests are used as effectively as possible. From the beginning, data have been accumulated on the validity of tests of the battery in predicting success in both elementary and advanced naval training schools for enlisted personnel, relating test scores to such criteria of school success as ratings on achievement, grades in individual courses, final school grades, rank in class, and success or failure. Validity coefficients have been determined for over 20 elementary and 18 advanced types of schools, including an over-all total of 350 or more classes. In addition to the routine determination of validity coefficients for these schools, a number of special research projects on the Basic Test Battery have been completed. The study summarized here was designed to determine the validity of the original tests of the battery, alone and in combination, in predicting success in ten types of elementary schools. Other studies will be reported in subsequent articles.

*Tests studied.* The tests used in this study included Form 1 of each of the following: General Classification Test; Reading Test; Arithmetical Reasoning Test; Mechanical Aptitude Test; and Mechanical Knowledge Test, using both Mechanical and Electrical scores. These tests have been described in the article referred to above.

*Populations studied.* The subjects of the study were trainees in ten types of elementary naval training schools for enlisted personnel. The distribution of these trainees in the various types of schools is shown in Table I. The data represent all graduates in classes for which data were available.

*Criterion of school success.* Final school grades, expressed in percentages, were used as the criterion of school success.

<sup>1</sup> This article is the third of a series of reports describing the work of the Test and Research Section and the second report on the Navy Basic Test Battery. Psychological Testing and Research in the Bureau of Naval Personnel: Work of the Navy's Test and Research Section. *Psychol. Bull.*, 1945, 42, 433-444. Psychological Test Construction and Research in the Bureau of Naval Personnel: Development of the Basic Test Battery for Enlisted Personnel. *Psychol. Bull.* 1945, 42, 561-571.



TABLE I

ESTIMATED COEFFICIENTS OF CORRELATION\* BETWEEN SCORES ON TESTS OF THE BASIC BATTERY, FORM 1, AND FINAL GRADES IN TEN TYPES OF ELEMENTARY NAVAL TRAINING SCHOOLS FOR AN UNSELECTED NAVY RECRUIT POPULATION

Type of Naval Training School	Number of Graduating Classes	Number of Cases	TESTS				
			General Classi- fication	Reading	Arith- metical Reasoning	Mechanical Aptitude	Mechanical Knowledge Mech. Score      Elect. Score
Basic Engineering	8	1480	.52	.52	.63	.52	.46      .39
Diesel	9	2160	.42	.35	.36	.26	.43      .46
Electrical	12	1747	.52	.52	.59	.44	.35      .49
Gunner's Mates	12	1677	.38	.39	.31	.28	.40      .43
Machinist's Mates	5	755	.33	.27	.44	.48	.48      .46
Radar Operators	4	1053	.60	.67	.61	.50	.35      .38
Signal	8	984	.49	.43	.44	.25	.13      .13
Sotreckeepers (WR)	4	678	.44	.47	.59	.37	†      †
Torpedo	7	880	.32	.35	.28	.27	.39      .35
Yeomen (WR)	2	738	.62	.59	.63	.38	†      †

\* Correction for restriction in range of test scores resulted in an average increase in the magnitude of the correlations of .09.

† Test not given to personnel in the Women's Reserve.



*Procedures.* During recruit training, the tests of the battery are administered to each recruit. On the basis of test scores and other factors, the decision is made as to whether or not he should be recommended for assignment to a naval training school. It has been common practice to use "cutting scores" on one or more tests for selection for each type of school. These "cutting scores" are based on studies of the relation between test scores and final school grades (or some other criterion of success) in specific types of schools and are subjected to continuing evaluation and revision.

In this study two types of correlational analysis were made to determine the relationship between test scores and grades: (1) Correlation coefficients were determined between trainees' scores on a single test and their final grades. (2) Correlation coefficients were determined between trainees' final grades and scores on a combination of two tests.

*Analysis of data.* Product-moment coefficients of correlation were calculated between scores on each test and final grades for each class separately in each of the types of schools studied.<sup>2</sup> Because of the variation which appeared from time to time in selection and training procedures, and in the bases for assigning final grades, these coefficients were not directly comparable either from class to class within schools or between schools. Furthermore, the obtained coefficients were attenuated by the restriction in range resulting from the use of the selection procedures and from elimination of failures. Therefore they would not be indicative of the effectiveness of the tests when used with the total or unselected population.

In order to secure a coefficient for each test that would be more nearly (1) comparable from school to school and from class to class within schools, and (2) representative of the correlation secured from an unselected population, two statistical procedures were used. First, the corrections for restricted range were made by using Kelley's formula.<sup>3</sup> The standard deviation of the unrestricted recruit population is equal to 10. The estimated coefficients obtained from the use of this formula could, under the assumptions given by Kelley, now be compared directly. Second, because a distribution of estimated coefficients was available for each test, an average value was computed to permit the convenient summarization of these statistics. The  $z$  transformation<sup>4</sup> was used and the average value converted to  $r$ . This  $r$ , termed the estimated correlation coefficient or the single-test validity coefficient, was used as representative of the correlation coefficient that would be determined in an unselected population in each type of school for each test with final grades. Table I presents these correlation coefficients. Through comparing them, it is possible to identify the test which

<sup>2</sup> These correlation coefficients were supplied through the cooperation of a Project of the National Defense Research Committee.

<sup>3</sup> Kelley, Truman L. *Statistical Method*. Macmillan, 1923.

$$r \text{ (estimated)} = \frac{r}{\sqrt{\frac{\sigma^2}{\Sigma^2} - r^2 + \frac{\sigma^2}{\Sigma^2} + r^2}}$$

Where  $r$  = obtained coefficient of correlation

$\sigma$  = the standard deviation of the test in the restricted population

$\Sigma$  = (ten), the standard deviation of the test in the unrestricted population.

<sup>4</sup> Peters, C. C. and Van Voorhis, W. R. *Statistical Procedures and their Mathematical Bases*. New York: McGraw-Hill, 1940.



TABLE II

VALIDITY COEFFICIENTS FOR THE BASIC TEST BATTERY IN TEN TYPES OF ELEMENTARY NAVAL TRAINING SCHOOLS				
Type of Naval Training School	Highest Validity Coefficient for a Single Test		Highest Validity Coefficient for Combination of Two Tests	
	Test	<i>r</i>	Combination of Two Tests	<i>r</i> Based on Summed Scores
Basic Engineering	Arithmetical Reasoning	.63	Arithmetical Reasoning & Mechanical Knowledge (M)	.63
Diesel	Mechanical Knowledge (E)*	.46	General Classification & Mechanical Knowledge (E)	.51
Electrical	Arithmetical Reasoning	.59	Arithmetical Reasoning & Mechanical Knowledge (E)	.63
Gunner's Mates	Mechanical Knowledge (E)	.43	Reading & Mechanical Knowledge (E)	.47
Machinist's Mates	Mechanical Aptitude or Mechanical Knowledge (M)†	.48	Mechanical Aptitude & Mechanical Knowledge (E)	.53
Radar Operators	Reading	.67	Reading & Arithmetical Reasoning	.70
Signal	General Classification	.49	General Classification & Arithmetical Reasoning	.50
Storekeepers (WR)	Arithmetical Reasoning	.59	Reading & Arithmetical Reasoning	.58
Torpedo	Mechanical Knowledge (M)	.39	Reading & Mechanical Knowledge (M)	.43
Yeomen (WR)	Arithmetical Reasoning	.63	General Classification & Arithmetical Reasoning	.67

\* (E) represents Electrical Score on the Mechanical Knowledge Test.

† (M) represents Mechanical Score on the Mechanical Knowledge Test.



may be termed the "highest single predictor" of school success for each type of school.

Because some combinations of scores on two or more tests can be expected to be more effective in predicting success than scores on a single test, multiple correlations were computed (using the estimated correlation coefficients) for combinations of scores on two tests with the criterion of final grades. The question of convenience of use in the classification centers limited the consideration to combinations of two tests.

The convenience of simply adding the test scores led further to the investigation of the magnitude of the correlation coefficients between the sums of the test scores for two tests and final grades. These correlations also were computed from the estimated correlation coefficients with the standard deviations equal to that for an unselected recruit population (ten).<sup>5</sup> The correlations between sums of test scores and final grades were called validity coefficients based on summed scores. Table II shows for each school the highest single-test validity coefficient, the multiple correlation coefficients, and the highest validity coefficients as they were computed from the estimated correlation coefficients.

*Findings.* Table I presents the estimated correlation coefficients between single test scores and final school grades in the 10 types of schools. From the data in this table it is apparent that:

1. A varying but substantial degree of relationship exists between recruit performance on tests of the Basic Test Battery and subsequent success in certain types of elementary naval training schools for enlisted personnel. In general, the best test for each type of school correlates about .53 with school grades, the second-best test about .48, and the third-best test about .46.

2. The predictive efficiency of the *battery* of tests varies by schools. The highest validity coefficient among the ten types of schools is .67 between Reading Test scores and grades in Radar Operator schools. At the other extreme, the highest validity coefficient for Torpedo schools is .39 between final school grades and scores on the Mechanical part of the Mechanical Knowledge Test.

3. The predictive efficiency of *each* test varies by schools: for example, the single-test validity coefficients of the General Classification Test range from .33 with final school grades in Machinist's Mates schools to .62 with final grades in Yeomen schools.

4. Each of the tests studied, with the exception of the Mechanical Aptitude Test, has the highest estimated correlation coefficient in at least one type of school. Statistical analyses of the significance of the difference between the estimated correlation coefficients were not made. The tests, together with the schools for which they appear to be the most effective predictors, are listed below:

*General Classification Test:* Basic Engineering and Signal schools.

*Reading Test:* Gunner's Mates and Radar Operators schools.

*Arithmetical Reasoning Test:* Electrical, Storekeepers, and Yeomen schools.

*Mechanical Knowledge Test (Mechanical Score):* Torpedo schools.

*Mechanical Knowledge Test (Electrical Score):* Diesel schools.

*Mechanical Aptitude Test and Mechanical Knowledge Test (Mechanical Score):* Machinist's Mates schools.

<sup>5</sup> The formula used

$$r(a+b)x = \frac{r_ax + r_bx}{\sqrt{2(1+r_{ab})}}$$

$x$  = final grade  
 $a, b$  = test scores



The validity coefficients shown in Table I are high enough to indicate that at successively higher levels of scores on tests, consistently higher percentages of examinees would make average or better final school grades. Percentage graphs were prepared to demonstrate graphically this relationship for each of the three tests most highly correlated with school grades in each type of school. Figure 1, which is representative of these graphs, shows for the Diesel schools the actual percentages of trainees at various General Classification Test score levels who made average or better final grades, together with the theoretical

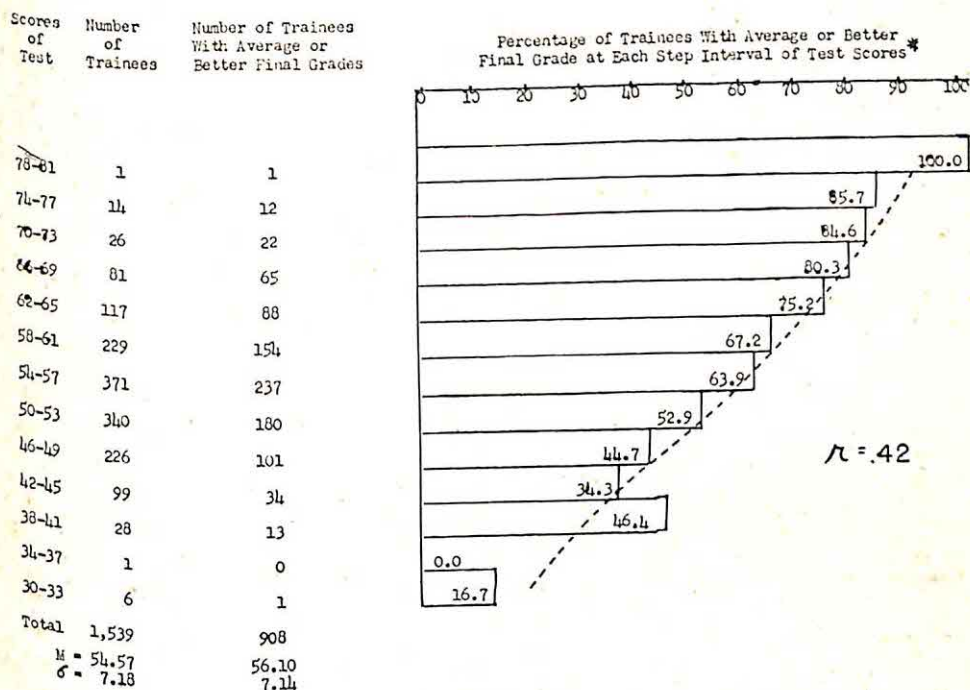


FIGURE 1. PREDICTIVE EFFICIENCY OF THE GENERAL CLASSIFICATION TEST, FORM 1, IN DIESEL SCHOOLS.

\* Observed percentages are indicated by bars, theoretical percentages by broken line.

Percentages computed from the validity coefficient. It is evident from examination of Figure 1 that the actual and theoretical percentages correspond closely, and that there is a steady increase at each higher level of General Classification Test score in the percentage of trainees with average or better final grades.

Table II presents for each of ten types of schools the highest validity coefficients for single tests and for combination of two tests. Both the multiple correlation coefficients and the validity coefficients based upon sums of scores for the same combination of tests and final grades are shown. From examination of this table it may be seen that with one exception the observed values of the validity coefficients based on sums of scores are slightly higher than the values of the single-test validity coefficients and that they approximate the values of the multiple correlation coefficients. No tests of the significance of the differences were made because in view of the assumptions involved they were not considered determinable. However, the consistent increase in the value of the



correlation coefficients with the use of two tests would suggest that the use of a second test adds to the effectiveness of prediction.

*Discussion.* The findings reported in the previous section support the use of Basic Test Battery scores in determining which enlisted personnel should be recommended for the types of specialized schools under consideration in this study. Any one of the tests of the battery would be of value in predicting success in some of the types of schools, and the use of the entire battery aids considerably in improving the selection procedures.

The findings suggest also that the use of cutting scores on two tests selected carefully for each type of school might in at least half of the types of schools be more efficient than the use of single test scores for predicting success in school. From the practical viewpoint the use of two tests adds stability to the prediction for future classes, not only from the point of view of reducing sampling error, but also because with a broader predictive battery any changes in the nature of the criterion would be less likely to produce a pronounced drop in effectiveness of prediction. Furthermore, the simple summation of scores on two tests may be nearly as effective as the most efficient single weighting in the least squares sense and is more practicable for use in the Navy situation.



# DETECTING PSYCHONEUROTIC TENDENCIES IN ARMY PERSONNEL\*

HOWARD E. PAGE, MAJOR, AGD

*Classification and Replacement Branch, Adjutant General's Office,  
Washington, D. C.*

That psychoneurotics may be as unfit for military service as persons suffering from purely physical limitations has not been fully recognized by all army personnel. The soldier with defective hearing or poor vision is given special consideration as a matter of course; the soldier with pronounced psychoneurotic tendencies, however, is often mistaken as a malingerer or "goldbrick" and treated accordingly.

In some respects the psychoneurotic may constitute a greater problem than the physically handicapped in that he may be even more difficult to fit in as an integral part of an efficient fighting organization. Often he is a constant source of difficulty and annoyance to his fellow soldiers and his superior officers throughout his service in the Army. There is, moreover, danger of irreparable damage to his own personality by aggravation of his maladjustment. It would, therefore, be of considerable benefit to the Army and the individual if psychoneurotics were diagnosed and treated at an early point in their army career.

Psychiatric service is now available in most army organizations. However, because facilities are limited, the individual who comes before a psychiatrist is probably already in distress. There is usually a history of maladjustment and conflict in his army life at this point. It would be far more desirable if such individuals were brought to the attention of the psychiatrist before serious difficulties have arisen. A simple test that screens out from the large mass of soldiers those most in need of psychotherapy would be extremely helpful, in that such men could be detected and referred for psychiatric diagnosis and treatment with a minimum loss of time. It is not to be expected that any one test will infallibly differentiate psychoneurotics from all other individuals. Hunt (3) has pointed out the limits of the use of screening tests in military selection. It may be expected, however, that a test can be prepared which will pick out from a group the majority of psychoneurotics and eliminate from further consideration all but a few of those not seriously in need of psychiatric consultation. It is the description of the development of such a test that is the primary purpose of this study.

There are available and in general use by psychologists a number of tests designed to measure psychoneurotic tendencies. It was decided that the effectiveness and practicability of certain of these tests to measure psychoneurotic tendencies in the Army should first be investigated. Then, depending on the results of the investigation, one of the tests would be selected for use, or a new test prepared.

In selecting tests of psychoneurotic tendencies to determine their utility in detecting psychoneurotics in the Army, there are several factors to consider in addition to the effectiveness they have displayed with civilian populations. It is necessary that the tests be suitable for administration to large groups; that they be comprehensible to and answered by even the duller members of

\* The following article represents the opinion of the author only and is not to be construed as representing the official opinion of the War Department or the Army of the United States.



an average group; that they not require much time to give; and, that they be quickly and easily scored.

Such factors as just enumerated are often lacking in tests generally in use. They are often standardized on groups of high educational level with the result that the vocabulary is beyond the reach of many. Furthermore, in the normal setting for the administration of such tests time required for scoring and the ease with which such scoring may be accomplished are factors of little importance. In the military situation, however, these factors are paramount.

A survey of the personality tests immediately available indicated that the BI-N scale of the "Personality Inventory" by R. G. Bernreuter (2) and the "Psychosomatic Inventory" by R. A. McFarland and C. P. Seitz (5), while not ideal from the point of ease in interpretation and scoring, held promise of meeting the requirements of this study.

The Personality Inventory consists of 125 questions such as "Do you day-dream frequently?" and "Do you often feel just miserable?" The subject answers "Yes," "No," or "?" for each question. Each response is assigned a weight by Bernreuter proportional to the degree to which that response indicates psychoneurotic behavior. The total score is the sum of the individual weights for an adult male population.

The Psychosomatic Inventory is similar to the Personality Inventory in principle and scoring. However, it is divided into two parts of forty-six questions each. Part I emphasizes hypochondriacal aspects of psychoneurosis; Part II, anxiety aspects. On this test the subject answers either "Often," "At times," "Seldom," or "Never" to the questions. Norms are available for converting the raw score on each part as well as the total raw score to percentile scores.

In order to determine how effective the Psychosomatic Inventory and the Personality Inventory are in predicting psychoneurotic tendencies in Army personnel, it was first necessary to set up an accepted standard for measuring such tendencies with which results on the tests could be compared. The diagnoses of the neuropsychiatrists attached to the ASF Regional Hospital, Camp Lee, Virginia, and the ASFTC Consultation Service, Camp Lee, Virginia, were chosen as the criteria. Strict accord with theoretical principles would require that diagnoses be obtained on a typical cross-section of the Army population received here for training and these be compared with the test results of the same group. However, this procedure would have required the neuropsychiatrists to spend considerable time in observing and diagnosing many soldiers not in need of psychiatric treatment. Since the limited personnel and the pressure of regular work made the diagnoses of stable individuals unfeasible, a somewhat less satisfactory method for validating the tests was employed.

The procedure used consisted essentially of comparing the test scores of matched groups of 100 diagnosed psychoneurotic trainees with 100 undiagnosed trainees. The soldiers in the latter group had never appeared before any neuropsychiatrist at Camp Lee, and, so far as could be determined, had made a normal adjustment to military life. It is possible, however, that the undiagnosed group did possess individuals with tendencies toward instability. However, the inclusion of such individuals in the undiagnosed group would tend to lower the apparent ability of the tests to differentiate true psychoneurotics from other individuals. Any error introduced by such inclusion could produce results which erred only in being too conservative an indication of the effectiveness of these tests.

The Personality Inventory and the Psychosomatic Inventory were first administered to one hundred soldiers who had been diagnosed as psychoneurotic by the Neuropsychiatric Services at Camp Lee, Virginia. All of these men were in a trainee status at the time of diagnosis and testing.



A second group of one hundred men was selected from the trainees at the ASFTC. Since it was impossible at this point to ascertain what effect the age, intelligence, length of Army service, and section of the United States from which an individual came would have on his scores on the Personality Inventory and the Psychosomatic Inventory, it was felt that the group of undiagnosed trainees should be matched on these factors with the diagnosed psychoneurotics. Then differences found in the results of the groups on the two tests could not be attributed to these extraneous factors. The two groups were accordingly equated on these factors. The data showing their equivalence on these items is presented in Table I.

TABLE I

EQUIVALENCE OF CRITERION GROUPS: COMPARISON ON VARIOUS FACTORS OF 100 PSYCHONEUROTIC AND 100 UNDIAGNOSED SOLDIERS IN A TRAINEE STATUS AT ASFTC., CAMP LEE, VIRGINIA

## A. Chronological Age

	Num- ber	Range	Median	Q <sub>1</sub>	Q <sub>3</sub>	Mean	S D
Psychoneurotics	100	18-44	27.2	23.5	33.0	28.8	6.77
Undiagnosed	100	18-44	27.2	24.1	34.0	28.6	6.54
Difference			0			0.2	0.24
Critical Ratio			0			0.02	0.36

## B. Army General Classification Test Score

Psychoneurotics	100	42-149	91.0	73.1	105.0	90.70	23.65
Undiagnosed	100	42-143	86.0	67.2	103.3	91.90	24.80
Difference			5.0			-1.20	-1.15
Critical Ratio			1.17			0.35	0.47

## C. Length of Service (In days)

Psychoneurotics	100	19-236	75.4	49.2	115.0	87.7	45.8
Undiagnosed	100	9-228	71.8	55.3	91.3	81.5	42.4
Difference			3.6			6.2	3.4
Critical Ratio			0.46			0.99	0.77

## D. Service Command of Induction

	1	2	3	4	5	6	7	8	9	Total
Psychoneurotics	18	30	20	11	12	5	2	2	0	100
Undiagnosed	17	30	23	12	6	6	3	3	0	100

In Part A of Table I are given the range of ages, median and quartile ages, the mean age, and the standard deviation of the ages of the group of one hundred diagnosed psychoneurotics and of one hundred undiagnosed trainees. Inspection of these values reveals that the range and median ages of the two groups are identical, and that the means and standard deviation differ very little. The small critical ratio for these last two measures show these differences to have no statistical significance. Accordingly, the two groups may be considered to be matched in respect to age.

In Part B of Table I are found the statistical data on the Army General Classification Test scores for the two groups. It can be seen that the mean value and standard deviation of test scores for the undiagnosed group differs from those for the diagnosed psychoneurotic group by only 1.20 and 1.15 points, respectively. These differences are shown to have no statistical significance by their corresponding critical ratios of 0.35



and 0.47. A somewhat larger difference of 5.0 points exists between the median test scores of the two groups. However, this value, too, is not large enough to be of statistical significance.

Part C contains a comparison of the length of service of the groups. For the purpose of this study, the length of service was defined as the number of days from the date of induction to the date of testing. It can be seen that the psychoneurotic group had been in the Army an average of 6.2 days longer than the undiagnosed group. This difference is shown to be statistically not significant by the critical ratio of 0.99. It can also be seen that no significant differences exist between the standard deviations or median of the length of service of each group.

The number of trainees inducted from each service command is shown for both groups in part D of Table I. Inspection of the Table reveals that, in general, the numbers furnished the two groups by each service command are equal.

From the above it is apparent that on the factors of age, intelligence as measured by Army General Classification Test, length of army service prior to being tested, and section of the country from which they came, the groups of psychoneurotic and undiagnosed individuals are equivalent. It may be assumed, therefore, that any differences found in the performances of the groups on the Psychosomatic Inventory and the Personality Inventory are not the result of differences in these factors.

The Bernreuter Personality Inventory and the Psychosomatic Inventory were next administered to the one hundred undiagnosed trainees. The means, standard deviations, medians and quartile values of the scores made by the one hundred psychoneurotics and the one hundred undiagnosed trainees on Part I, Part II, and the total of the Psychosomatic Inventory, and on the Personality Inventory were computed and are listed in Table II. For these computations percentile scores were used with the higher percentiles indicating the greater degrees of psychoneurotic tendencies.

Part A of Table II contains the results for the total score on the Psychosomatic Inventory. It will be seen that the diagnosed psychoneurotics had a mean score of 93.80, while the mean score of the non-diagnosed group was 61.76. The critical ratio of 10.97 found for the difference between these means indicates that there is almost no possibility that the large difference found was the result of chance. The standard deviations for the psychoneurotics and the undiagnosed group of 10.21 and 27.32 respectively, show that the scores for the first group are much more compactly grouped around the mean than are the scores of the second. Inspection of the quartile points shows that 75 per cent of the psychoneurotics score at the 94.6 percentile or *higher*, while 75 per cent of the undiagnosed group fall at the 89.3 percentile or *lower*.

Study of Parts B and C of the Table, which contain the data for Parts I and II, respectively, of the Psychosomatic Inventory, reveals that each section of the test produces results wholly comparable with those for the entire test. It will be seen that on both parts the mean scores of the psychoneurotics are higher than the corresponding mean scores of the undiagnosed soldiers by amounts that are statistically significant; the scores of the psychoneurotics are more compactly grouped than are those of the undiagnosed group as shown by the smaller standard deviations and the smaller quartile deviations for the psychoneurotic group; and the first quartile points for the psychoneurotics are higher than the third quartile points for the undiagnosed group.

In Part D of Table II are given the results of the two groups on the Bernreuter Personality Inventory. Inspection reveals that the mean score of the psychoneurotics is 79.21, or about twice as great as the mean score of 39.49 obtained by the undiagnosed trainees. The difference of 39.72 between these means is shown to be statistically significant.



cant by the critical ratio of 9.11. The standard deviations may be seen to be 28.47 and 33.08 for the psychoneurotic and undiagnosed groups, respectively. The difference of 4.61 is not statistically significant as shown by the critical ratio of 1.50. Examination of the quartile points discloses that 75 per cent of the psychoneurotics score 70 or above, whereas 75 per cent of the undiagnosed soldiers score 69 or less.

In general, the following conclusions may be drawn from Table II. The psychoneurotic group scores significantly higher than the undiagnosed group

TABLE II

COMPARISON OF SCORES OF 100 PSYCHONEUROTIC AND 100 UNDIAGNOSED SOLDIERS ON THE PSYCHOSOMATIC INVENTORY AND THE PERSONALITY INVENTORY

A. Psychosomatic Inventory—Total

	Num- ber	Range	Median	Q <sub>3</sub>	Q <sub>1</sub>	Q	Mean	S D
Psychoneurotic	100	30-99	97.7	99.2	94.6	2.30	93.80	10.21
Undiagnosed	100	1-99	65.5	89.3	39.3	25.00	61.76	27.32
Difference			32.2				32.04	-17.11
Critical Ratio			8.80				10.97	8.31

B. Psychosomatic Inventory—Part I

Psychoneurotic	100	44-99	98.3	99.1	96.8	1.15	95.46	8.52
Undiagnosed	100	4-99	70.5	92.2	43.0	24.60	65.65	26.20
Difference			27.8				29.71	-17.68
Critical Ratio			8.03				10.76	9.07

C. Psychosomatic Inventory—Part II

Psychoneurotic	100	15-99	95.6	98.1	81.0	8.55	87.49	16.21
Undiagnosed	100	3-99	60.3	80.3	33.5	23.40	56.88	27.21
Difference			35.5				30.61	-11.00
Critical Ratio			8.89				9.66	4.91

D. Bernreuter Personality Inventory (BI-N Scale)

Psychoneurotic	100	2-99	94.5	99.2	70.0	14.60	79.21	28.47
Undiagnosed	100	1-99	27.5	69.0	10.0	29.50	39.49	33.08
Difference			67.0				39.72	-4.61
Critical Ratio			12.27				9.11	1.50

on the Bernreuter Personality Inventory and on the whole and the parts of the Psychosomatic Inventory. On the Psychosomatic Inventory the psychoneurotics obtain scores which are very closely grouped at the upper end of the scale. It may be noted that the median of the undiagnosed trainees for the Psychosomatic Inventory is 65.5 or 15.5 points above the median of 50 that one might expect with a sample similar to the standardizing group. The median of the undiagnosed group on the Personality Inventory, on the other hand, is 27.5 or 22.5 points below the median of Bernreuter's standardization group. These results indicate that a representative sample of trainees at the ASFTC may differ sufficiently from any group used in the standardization of available tests of psychoneurotic tendencies to necessitate the computation of new norms for such army personnel. A comparison of Parts B and C of the Table



shows that the scores obtained on Part I of the Psychosomatic are for each group higher than the scores obtained by the same group on Part II. It may be that army life has emphasized the physical aspects of maladjustment, such as hypochondriasis and conversion hysteria, more than the purely mental aspects for these samples of trainees.

As a further means of determining the validity of the Inventories as measures of psychoneurotic tendencies, biserial coefficients of correlation were computed using scores on each scale as the continuous series and diagnosed psychoneurotic—undiagnosed trainee as the dichotomous classification. It is to be pointed out that the statistical use of biserial coefficients of correlation in this situation is not for the purpose of the development of regression equations, but rather is used as a method to amplify the techniques of statistical significance. The results of these calculations may be found in Table III. Inspection of the Table disclosed that the scales all have a high relationship with the diagnoses of the neuropsychiatrists, varying from .71 for Part II of the Psychosomatic Inventory to .80 for the total of the Psychosomatic Inventory. It should be noted that the validity coefficient for Part I and for the total of the Psychosomatic Inventory are practically identical. Thus the addition of the 46 questions of Part II to the 46 questions of Part I does not appear to increase the validity of Part I.

TABLE III

BISERIAL CORRELATION FOR PERSONALITY INVENTORY SCORES WITH PSYCHONEUROTIC-  
UNDIAGNOSED CATEGORIES, BASED ON 100 PSYCHONEUROTIC  
SOLDIERS AND 100 UNDIAGNOSED SOLDIERS

<i>Test</i>	<i>r<sub>bis</sub></i>	<i>P. E.</i>
Bernreuter BI-N	.75	.03
Total Psychosomatic	.80	.03
Part I Psychosomatic	.79	.03
Part II Psychosomatic	.71	.04

In order to determine to what degree the factors measured by each scale were related, the coefficients of correlation between the Personality Inventory and the Psychosomatic Inventory and its parts were calculated and are presented in Table IV. Inspection of the Table shows that the Personality Inventory has a substantial relationship to the parts and total scales of the Psychosomatic Inventory, the coefficients of correlations between these scales ranging from .57 to .63. Parts I and II also have a marked relationship as shown by the coefficient of correlation of .57 between these measures. The high coefficients

TABLE IV

INTERRELATIONSHIPS OF PERSONALITY INVENTORY AND TOTAL SCORE,  
PART I, AND PART II OF THE PSYCHOSOMATIC INVENTORY

	<i>PS-I</i>	<i>PS-II</i>	<i>PS-T</i>
BI-N			
PS-I	.57	.60	.63
PS-II		.57	.87
			.84

of correlation between the parts and the total of the Psychosomatic Inventory are, of course, not too meaningful, since each part constitutes half of the total and, therefore, the computations involve the spurious element of, in part, correlating a test against itself.



The relationships between psychoneurotic tendencies, as measured by the Psychosomatic Inventory and Personality Inventory scales, were correlated against the factors of Army General Classification Test Score, age, and length of service for the 100 undiagnosed trainees. The results of these computations are listed in Table V.

TABLE V

RELATIONSHIP OF SCORES ON THE PERSONALITY INVENTORY AND ON THE TOTAL SCALE, PART I, AND PART II OF THE PSYCHOSOMATIC INVENTORY TO AGCT SCORES, AGE, AND LENGTH OF SERVICE

	AGCT		Age		Length of Service	
	<i>r</i>	P. E.	<i>r</i>	P. E.	<i>r</i>	P. E.
BI-N	-.12	.07	.14	.07	-.14	.07
PS-I	.04	.07	.12	.07	-.15	.07
PS-II	.10	.07	.30	.06	-.24	.06
PS-T	.04	.07	.26	.06	-.19	.07

Examination of the second column discloses that scores on the Army General Classification Test have a negligible relationship with the four psychoneurotic scales, the coefficients of correlation varying from  $+.10$  to  $-.12$ . In each instance the coefficient of correlation is considerably less than four times the probable error. Accordingly, it may be concluded that psychoneurotic tendencies as measured by the Psychosomatic Inventory and the Personality Inventory, have no relationship of statistical significance with intelligence as measured by the Army General Classification Test.

The coefficients of correlation between age and psychoneurotic tendencies as measured by the tests are listed in the fourth column of Table V. A small positive relationship between increasing age and increasing psychoneurotic tendencies may be noted. However, it will be seen that the probable errors are relatively large in comparison with their corresponding coefficients of correlation. As a result, it may be assumed that little or no relationship exists between age and psychoneurotic tendencies.

In the last two columns of Table V are given the coefficients of correlation and their corresponding probable errors for the relationships between the length of service and scores on the four scales of psychoneurotic tendencies. It is readily seen that the coefficients of correlation are in each instance less than four times the value of their corresponding probable errors. The slight negative relationships between psychoneurotic behavior and length of service shown by the coefficients of correlation are not, therefore, statistically reliable.

In summary, it may be stated that the coefficients of correlations between psychoneurotic tendencies, as measured by the Personality Inventory and the Psychosomatic Inventory, and the factors of intelligence, age, and length of service are so small, in comparison with their probable errors, that statistically they cannot be considered to be indicative of any definite relationship.

The results listed and discussed in the preceding section lead to the conclusion that both the Psychosomatic Inventory and the Personality Inventory are fairly effective instruments for the initial sorting of psychoneurotic individuals from large groups. The statistical data presented, however, fails to disclose several difficulties encountered in their use with Army personnel. These were as follows: First, each test required more time to administer than could be easily included in the training program schedule; secondly, scoring of



any considerable number of tests was a lengthy task; thirdly, several items in each test, e.g., "Does your ambition need occasional stimulation through contact with successful people?", occasioned many questions as to their meaning and, as a result, increased the difficulties of administering the tests; and, fourthly, many individuals, particularly those who had difficulty understanding the questions, had to be continuously urged to omit no items and to consider each one carefully before answering.

It was noted in the discussion of the results that Part I of the Psychosomatic Inventory was more effective in differentiating psychoneurotics than was the total Inventory. Apparently, the effect of adding the items in Part II to those in Part I is to decrease rather than increase the validity of the scale. Conversely, it was seen that Part II in itself was a fairly valid scale of psychoneurotic tendencies. From these results, it may be surmised that those items in Part II which are effective measures of psychoneurotic tendencies relate to aspects of psychoneurosis which are also well covered by items in Part I, and further, that Part II contains a number of items which add little to the effectiveness of the scale. If these assumptions are correct, combining Part II with Part I, will, on the one hand, result in no increase in the factors of psychoneurosis that will be measured, and, on the other hand, will introduce a number of items, which, since they do not differentiate psychoneurotics from stable individuals, will tend to decrease the differences in score between groups of such individuals. Thus, the net effect would be to decrease the validity of Part I by the addition of Part II.

It is apparent from the above that the number of items in the particular scales used in this study are by no means an indication of their effectiveness. Altus and Bell (1) have indicated that a short scale may give as reliable results in the measure of maladjustment as scales consisting of more numerous items.

It is reasonable to assume that by proper selection of those items which appear to be the more valid measures of psychoneurotic tendencies a short test could be prepared which would lose little in the way of reliability or validity. Wallin (6) indicates the military need for such tests and further indicates their value for non-military uses as well. On this basis, an attempt has been made to develop such an inventory of psychoneurotic tendencies.

In the preparation of this inventory it was deemed advisable to use items occurring in the scales already used in the preliminary work. No attempt was made to originate new items.

In order to select the best items from each scale for use in preparing a new inventory an item analysis was made of the answers given by the criterion groups on the Psychosomatic Inventory and the Personality Inventory. Although the percentages of each group making specific responses to the various items are indicative of the validity of the items as measures of psychoneurotic tendencies, they are not easily compared to determine which items are most effective. A formula developed by T. L. Kelley (4) for assigning weights to responses in proportion to their ability to differentiate between two groups or characteristics furnishes a method for analyzing the percentages. This method was used and only those items producing a maximum difference on the Kelley weighting scale were considered. Two other criteria were also used in the final selection of items. Where two or more items equivalent on the Kelley weighting scale covered almost wholly the same aspect of psychoneurotic tendencies only one was included in the scale. Finally those items which had shown themselves to be difficult of interpretation to many individuals were omitted.

Using the criteria discussed above, a final selection of twenty-eight items



was made for inclusion in the shortened scale. For convenience this revised scale will be referred to in the future as the "Psychoneurotic Inventory."

It will be recalled that the Psychosomatic Inventory offers four possible answers: "Often," "At times," "Seldom," or "Never," while the Bernreuter Personality Inventory is answered by marking either "Yes," "No," or "?." The use of both systems of answering questions within the same scale was thought to be inadvisable. Since the Psychosomatic Inventory had contributed the major part of the questions the method of allowing the choice of four answers was selected for use with the Psychoneurotic Inventory.

As a result of this decision no scoring weights were available for the questions derived from the Bernreuter Personality Inventory which could be used for the new scale. It was therefore necessary to obtain a criterion for weighting the new answers to these questions.

This was accomplished by using the one hundred soldiers diagnosed as psychoneurotic by neuropsychiatrists of the Army Medical Corps as one of the criterion groups. A second criterion group consisted of 500 undiagnosed trainees in the ASFTC who had just begun basic training. The latter group was selected in a manner to make it representative of the trainees received in the ASFTC at the time of the study. A comparison of this group was likewise made with available information on more than eighty thousand trainees received at the training center over a period of eighteen months. There was no statistically significant difference between the two groups in respect to score on the Army General Classification Test, or in educational achievement as determined by the number of years of schooling received. No statistics were available for age comparisons. The mean age of the 500 man criterion group was 29.2 years with standard deviation of 5.9 years.

The Psychoneurotic Inventory was next administered to the 100 psychoneurotics and the 500 undiagnosed trainees. By means of item analysis and Kelley's formula for weighing items, weights for each response to each item were calculated. The Psychoneurotic Inventory for both the psychoneurotic and the undiagnosed groups were then scored by use of these computed weights.

In order to determine the validity of the new Psychoneurotic scale a comparison of the raw scores made by the criterion groups on the inventory was undertaken. These comparisons are presented in Table VI. Inspection of this table discloses that the mean score for the psychoneurotic group is 109.4 or more than twice as large as the mean score of 49.3 obtained by the undiagnosed group. The critical ratio of 15.7 shows the difference of 60.1 between the two means to be significant and not attributable to chance variations in the samples. From examination of the Table it is seen that the medians show a similar, but even larger, difference between the samples. On the other hand, there are but slight differences found between the standard deviations and between the semi-interquartile ranges of the two groups. It may be concluded, therefore, that the variability of each group is approximately equal, but that the psychoneurotics are grouped chiefly along the upper end of the scale and the undiagnosed soldiers mainly at the lower end of the scale.

As a further measure of the validity of the Psychoneurotic Inventory a biserial correlation was made with scores on the Inventory as the continuous series and diagnosed psychoneurotic—undiagnosed as the dichotomous classification. The biserial coefficient of correlation was found to be .78 with a probable error of .02. It is to be noted that this coefficient of correlation for the Psychoneurotic Inventory is of the same relative magnitude as the corresponding biserial coefficients of correlation calculated for the Bernreuter Personality



TABLE VI

COMPARISON OF SCORES OBTAINED ON THE PSYCHONEUROTIC INVENTORY BY  
CRITERION GROUPS OF 100 DIAGNOSED PSYCHONEUROTIC SOLDIERS  
AND 500 UNDIAGNOSED SOLDIERS

	No.	Range	Mean	S D	Median	Q <sub>3</sub>	Q <sub>1</sub>	Q
Undiagnosed	500	1-157	49.3	36.8	37.5	72.4	20.2	26.1
Psychoneurotic	100	9-157	109.4	34.6	115.8	136.2	87.0	24.6
Difference			60.1	2.2	78.3			
Critical Ratio			15.7	0.8	16.3			

Inventory and the Psychosomatic Inventory. The Psychoneurotic Inventory may therefore be considered to have the same degree of validity as either of the longer inventories.

In order to show pictorially the effectiveness of the Psychoneurotic Inventory as a screening test to select psychoneurotics from random samples of trainees the per cent of each group scoring in each ten point interval of raw scores at the midpoint of the interval is plotted in Figure 1.\*

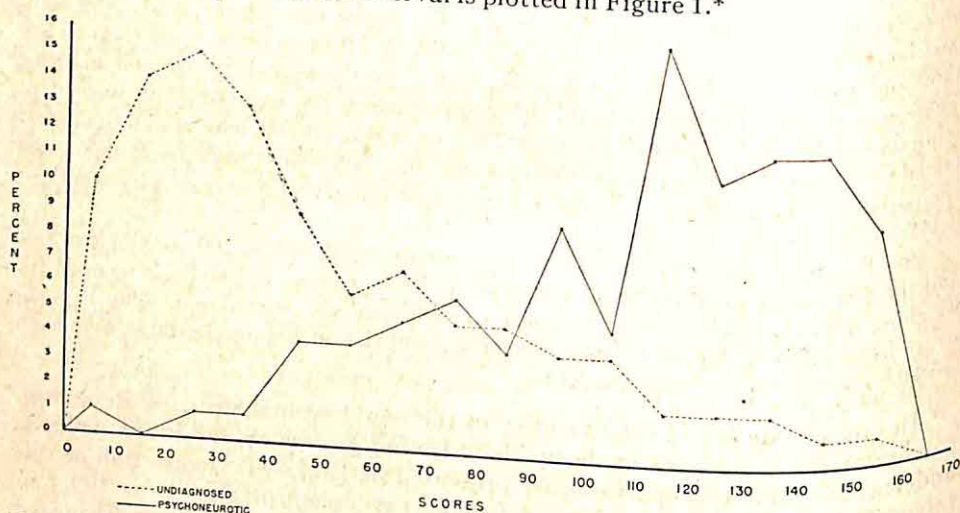


FIGURE 1. DISTRIBUTION OF SCORES ON THE PSYCHONEUROTIC INVENTORY BASED ON 500 UNDIAGNOSED AND 100 PSYCHONEUROTIC INDIVIDUALS AT ASFTC CAMP LEE, VA.

Examination of this Figure discloses that the curve for the undiagnosed group which is based on 500 cases is for all practical cases smooth. The curve for the 100 psychoneurotics, however, exhibits irregularities indicating the desire for a larger group in order to obtain a wholly stable distribution. If we accept, however, the trends indicated in the curves depicted, the value of the Psychoneurotic Inventory as a screening test becomes apparent. Keeping in mind the precautions advanced by Hunt (3) for the use of screening tests, it appears that careful consideration and study should be given any individual making a score of 100 or above on the Psychoneurotic Inventory.

\* The author recognizes the likelihood that on repetition on other groups, the separation here found will not be so great, because of the use of the same groups for validation as for item analysis and item selection.



In order to determine the relationship of scores on the Psychoneurotic Inventory with the factors of age, education, intelligence, and length of Army service, a series of correlations were made based on the data for the two criterion groups. The results of these computations are presented in Table VII.

TABLE VII

RELATIONSHIP OF SCORES ON THE PSYCHONEUROTIC INVENTORY TO AGCT TEST SCORES, AGE, LENGTH OF SERVICE, AND EDUCATION, FOR SAMPLES OF 500 UNDIAGNOSED TRAINEES AND 100 DIAGNOSED PSYCHONEUROTIC TRAINEES

	<i>Undiagnosed</i>		<i>Psychoneurotic</i>	
	<i>r</i>	<i>P. E.</i>	<i>r</i>	<i>P. E.</i>
Army General Classification Test	-.33	.06	-.08	.07
Age	.12	.07	-.15	.07
Length of Service	.03	.07	.00	.06
Education (Yrs. Completed)	-.23	.06	-.18	.07

Examination of the first row discloses that a negative correlation exists between scores on the Army General Classification Test and scores on the Psychoneurotic Inventory for the 500 undiagnosed trainees. Since the value of  $-.33$  for the coefficient of correlation is more than four times its probable error of  $.06$ , the coefficient is of statistical significance. However, it is difficult to determine whether there is a corresponding psychological significance to the small degree of relationship found, particularly since neither the Bernreuter Personality Inventory nor the Psychosomatic Inventory showed any statistically significant relationship with Army General Classification Test scores for the undiagnosed sample. Moreover, it may be seen from Table VII that no significant relationship exists between the scores made on the Army General Classification Test and the Psychoneurotic Inventory by the diagnosed psychoneurotics. This result would tend to further indicate that psychologically no significant relationship exists between measures of psychoneurotic tendencies and intelligence.

The second row of Table VII contains the coefficients of correlation for age and Psychoneurotic Inventory Test scores. These are found to be  $.12$  and  $-.15$  for the undiagnosed and psychoneurotic groups, respectively. As the corresponding probable errors are  $.07$  and  $.07$ , neither of the coefficients is of statistical significance.

Inspection of the third row reveals that there is no relationship of significance between length of service and test scores made by either criterion group. The probable errors are, in fact, larger than the coefficients of relationship for the relationship.

The coefficients of correlation between education and Psychoneurotic Inventory scores for the undiagnosed and psychoneurotic groups may be found from row 4 of Table VII to be  $-.23$  and  $-.18$ , respectively, and to have corresponding probable errors of  $.06$  and  $.07$ . There is consequently no significant relationship between the factors of education and psychoneurotic tendencies for the samples used. From the above results it is apparent that no relationship of significance exists between psychoneurotic tendencies as measured by the Psychoneurotic Inventory and the factors of age, education, and length of service.

It may be concluded, therefore, that on the basis of available data, the criterion group of 500 undiagnosed trainees may be expected to obtain results on the Psychoneurotic Inventory that are representative of the entire trainee population and that, accordingly, the utilization of this group's results to establish norms for use in Army trainee populations is justified.



From the foregoing discussion of the relationships between scores on the Psychoneurotic Inventory and the factors of age, education, length of Army service, and Army General Classification Test scores it is evident that, with the exception of the latter, these factors could not have been the cause of the differences found on the Inventory. In order to determine if differences on the Army General Classification Test had been responsible for part or all of the differences found on the Inventory, a comparison of the distribution of score on the Army General Classification Test was made. Inspection of Table VIII

TABLE VIII  
COMPARISON OF AGCT SCORES OF NORMING GROUPS OF 500 UNDIAGNOSED  
SOLDIERS AND 100 PSYCHONEUROTIC SOLDIERS

	Num- ber	Mean	Army General Classification Test				
			S. D.	Median	Q <sub>3</sub>	Q <sub>1</sub>	Q
Undiagnosed	500	100.9	22.1	102.4	118.2	84.6	16.8
Psychoneurotic	100	98.5	19.3	103.6	112.9	88.8	2.0
Difference		2.4	2.8	1.2			
Critical Ratio		1.1	1.8	0.4			

discloses that the mean score for the undiagnosed group was 100.9, and that for the psychoneurotic group it was 98.5. The difference of 2.4 is shown to be statistically not significant by the critical ratio of 1.1. It may be seen that the differences in the standard deviations and median scores of the two groups are also not statistically significant. It may be assumed, therefore, that the differences in scores on the Psychoneurotic Inventory by the two groups are not the result of differences in the intelligence of the two groups as measured by the Army General Classification Test.

Since it has been demonstrated that age, length of service, education, and service command of induction have no relationship to scores on the Psychoneurotic Inventory, the differences shown on these items cannot be considered to have influenced the size of the differences found on the scores of the Inventory by the two groups. Therefore, differences between the two criterion groups on these items, while of interest, are not of immediate concern in this study and will accordingly not be discussed.

A preliminary investigation was made of the relationship between the number of times individuals went on sick call and their scores on the Psychoneurotic Inventory. The calculations were based on data found for one training company of 244 trainees and covered approximately the initial four weeks of the training program. The coefficient of correlation was found to be .25 with a probable error of .04. These results indicate a small but positive relationship between these factors which is statistically significant. Since hypochondriasis is often the predominating feature of psychoneurotic tendencies, the positive relationship is not surprising. It may be noted, however, that the coefficient of correlation found here is so low as to make the sick call record of an individual of little value in predicting his psychoneurotic tendencies. Inasmuch as psychoneurotic tendencies show negligible relationship with length of service, it is extremely doubtful that any significant change would be made in the correlation obtained between sick call and psychoneurotic tendencies by increasing the length of time for which data was obtained. However, it is felt that this is a problem needing further investigation.



## SUMMARY AND CONCLUSIONS

In order to investigate the effectiveness of the Bernreuter Personality Inventory and the Psychosomatic Inventory as tests to screen psychoneurotics from large groups of soldiers a study of the Personality Inventory and the Psychosomatic Inventory was made on 100 diagnosed psychoneurotic soldiers and 100 undiagnosed soldiers. Coefficients of correlation between test scores and psychiatric diagnosis were found to vary from .71 for Part II of the Psychosomatic Inventory to .80 for the total of the Psychosomatic Inventory. On the basis of these results the tests were all considered to be valid measures of psychoneurotic tendencies.

An attempt was next made to construct an inventory of psychoneurotic tendencies which would retain the same relative validity and reliability as the Psychosomatic Inventory and the Personality Inventory, but would be shorter, be more easily understood by the soldiers, require less time for administration, and be more quickly scored, since these factors were important in testing large groups. On the basis of an item analysis of the Personality Inventory and the Psychosomatic Inventory, twenty-eight of the most valid questions in those tests were selected and combined into a scale which, for convenience, was labeled the Psychoneurotic Inventory. Using a group of 500 undiagnosed trainees and 100 diagnosed psychoneurotic trainees, scoring weights and norms were calculated for the new scale. Computations based on the distributions of scores on the Psychoneurotic Inventory by the two groups disclosed that the Inventory had a coefficient of correlation with the psychiatric diagnosis of .78. From these results it may be concluded that the Psychoneurotic Inventory, despite the fact that it is much shorter than either the Psychosomatic Inventory or the Personality Inventory, has the same relative validity and utility as a screening test for psychoneurotics as either of the longer scales.

In an attempt to discover whether psychoneurotic tendencies had significant relationship with any factor that could be easily measured, a series of correlations were made. These indicated, that no relationship existed between psychoneurotic tendencies and age, education, or length of service. A low positive correlation was found between scores on the Psychoneurotic Inventory and number of times the men went to the dispensary on sick call. This relationship was not surprising, since it might be reasonably supposed that individuals with pronounced hypochondriacal symptoms would go on sick call relatively more frequently than most stable individuals. Correlations for scores on the Army General Classification Test and psychoneurotic tendencies as measured by the various scales produced contradictory results. A negative correlation, which was low but statistically significant, was found with scores on the Psychoneurotic Inventory. On the other hand, correlations with the Personality Inventory, and with Part I, Part II and the total of the Psychosomatic Inventory were negligible. It is difficult to attribute any cause, statistical or psychological, for these results at present.

On the basis of these correlations, it was concluded that knowledge of the age, education, length of service, Army General Classification Test score, sick call record, and service command of induction of the individuals in a group was of little aid in the screening of psychoneurotics from the group.

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# A COMPARATIVE STUDY OF FOUR SCREENING TESTS FOR NEUROTICS

H. J. EYSENCK\*

*Psychological Dept., Mill Hill Emergency Hospital*

This war has seen the emergence of a number of tests designed to "screen" neurotics from the armed forces, or from special work for which they would be unsuitable (6). These tests are either considered to give sufficient evidence by themselves of the subject's instability, or are merely used to pick out candidates to be seen by the psychiatrist. Results reported in academic journals and service memoranda show that some of these tests possess a certain amount of validity in diagnosing "neuroticism," but few data are available to show how different tests compare with one another in this respect.

In the present study, comparative results are reported of the efficiency of four tests in distinguishing hospitalized service neurotics from normal (i.e. non-hospitalized) service personnel. Objections have been raised to this procedure because it is alleged that the neurotic group would have less incentive to do well, and would therefore give differential results not because of their neuroticism, but because of their lesser motivation. Three answers may be made.

1. In a comparative study of normal and neurotic subjects, Slater (9) found no differences on four tests of mental ability used in army selection procedure. To do well on these tests presumably requires considerable motivation. Similarly, direct studies of the influence of incentives on neurotics have failed to substantiate the view that their test-performances are due to lack of incentive (1).

2. In some of the tests used in the present study, the question of incentive does not really arise, as they are not tests of ability.

3. On all the tests used, a control investigation was carried out within the hospital, in order to see whether the more seriously neurotic patients did worse than the less seriously neurotic. Level of seriousness of neurosis was established on the basis of an independent psychiatric report (2), and tests were included in our battery only if they succeeded in discriminating between these two groups at the  $P = .01$  level.

The following tests were used.

1. *The Body Sway test of suggestibility* (5). The maximum body sway of the subject in response to the suggestion that he is falling forward, given by a gramophone record, constitutes his score on this test (3); he is instructed to remain standing perfectly still while the record is being played. The critical level is at the two-inch mark: 19% of normal subjects and 74% of neurotic subjects were found to sway two inches or more. The test is usually given as an individual test, but may be given as a group test if provision is made for the automatic recording of maximum body sway. This may be done mechanically, by means of a non-returning pointer, or electrically.

2. *The Dark Vision test*. Dark vision is tested by means of the Livingstone Rotating Hexagon (7) after 30 minutes dark adaptation. Letters and objects are exposed for the subject to recognize, 32 responses altogether at four levels of illumination being called for. A mixture of photopic and scotopic vision is examined by this test. The critical level is at the score of eight: 8% of normals and 71% of neurotics obtain a score as low as this, or lower (8). The test is usually given as a group test.

\* With the support of the Rockefeller Foundation.



3. *The Questionnaire test.* This test is of the usual neurotic personality inventory type, laying special stress on physiological manifestations of neurosis, although a few psychological symptoms are included. It is given as a group test, and is probably more influenced by the differential attitudes of neurotics and normals than are the other tests. No critical score is given as the test has not been published.

4. *The Rorschach Ranking test.* This is an adaptation of the Harrower-Erickson Multiple Choice test (4). We found that the Multiple Choice test had too low a reliability to be useful as a screening test (split-half reliability, corrected,  $= +0.64$ ), and accordingly modified the procedure so as to increase the reliability. This was done by presenting the subject with nine alternative responses to each ink blot,\* asking them to rank these in order of applicability, i.e. putting a number 1 after the response most like the ink blot, a number 2 after the response second-most like the ink blot, etc., down to a number 9 after the response least like the ink blot. Four neurotic and five normal responses are offered for each blot, and the numbers of the positions assigned the four neurotic responses by the subject constitute his score for that blot. The best score for each blot is therefore 30 ( $9+8+7+6$ ), and the worst score is 10 ( $1+2+3+4$ ). Scores for the ten blots are added, giving a range for the whole test of between 100 (neurotic end) to 300 (normal end). This method of scoring increases the reliability of the test to  $r = +0.84$ . The test does not correlate highly with intelligence ( $r = +0.08$ ), but shows a slight correlation with vocabulary ( $r = +0.27$ ). The critical level is at the score of 220; 74% of neurotics and 42% of normals score below this level.

These four tests were given to various groups of neurotics and normals,† and compared with each other by means of the Index of Screening Efficiency (S). This index is an adaptation of the formula for the correlation of point distributions, on the assumption that the populations which are being compared are not strictly speaking continuous. The formula is:

$$\text{Index of Screening Efficiency (S)} = \frac{\alpha\delta - \beta\gamma}{\sqrt{p_n \times p \times q_n \times q}}$$

in which  $\alpha$  = percentage of neurotics with neurotic scores;  
 $\beta$  = percentage of normals with neurotic scores;  
 $\gamma$  = percentage of neurotics with normal scores;  
 $\delta$  = percentage of normals with normal scores;  
 $p_n$  = percentage of neurotic scores;  
 $p$  = percentage of normal scores;  
 $q_n$  = percentage of neurotics;  
 $q$  = percentage of normals.

The index values for the four tests, together with the numbers of subjects tested, are given in Table I. Also given in that table are the values for the four

\* These were taken from Harrower-Erickson's list (4, pp. 254-258) leaving out in each case the response "Nothing at all." The actual responses used were: 1, A; 2, A; 3, A; 4, A; 5, C; 6, A; 7, A; 8, B; 9, A; 10, A. Slight verbal modifications were introduced in some cases, to suit the wording to English audiences.

† The neurotic groups were made up of unselected samples of the Hospital population, and are presumably roughly identical. The normal groups probably show greater heterogeneity, but are all slightly superior to the average in point of intelligence and stability.



tests of a slightly modified form of the Selection Index proposed by Hunt *et al.* (6). The formula for this index is:

$$\text{Selection Index } (D) = \frac{P}{P + P_m + P_f}$$

in which  $P$  = proportion of neurotics with neurotic score,  $P_m$  = proportion of neurotics with normal score, and  $P_f$  = proportion of normals with neurotic scores. This index would not appear to give comparable values for different tests unless  $P$  is kept constant; for the purpose of this formula the critical level was adjusted to make  $P = 75$  for each test. The two indices place the tests in the same order of efficiency, although  $S$  would appear to be more sensitive than  $D$  to slight differences.

TABLE I  
INDEX VALUES AND SUBJECTS TESTED

Test	S	D	Number of subjects tested		
			Normals	Neurotics	Total
Suggestibility	.40	.62	120	900	1020
Dark Vision	.64	.65	6063	96	6159
Questionnaire	.34	.50	1500	300	1800
Ranking Rorschach	.31	.48	150	300	450
Total			7833	1596	9429

While the relatively small number of subjects tested must lead to caution in interpretation, there would seem to be little doubt that the Suggestibility and Dark Vision tests compare very favorably with the Questionnaire test, and that the Ranking Rorschach test is not markedly inferior to it.

In assessing the value of these tests, the time required for administration must be taken into account. The Suggestibility test takes 3 to 5 minutes, the Dark Vision test takes just over one hour in all, the Questionnaire takes 15 minutes approximately, and the Ranking Rorschach test takes 35 minutes. On this basis, the Suggestibility test would appear to be the most efficient measuring instrument of the four.

*Conclusion.* The results reported may serve to draw attention to three tests (Suggestibility, Dark Vision, Ranking Rorschach) which have not hitherto to our knowledge been used in selection procedures, but which may be useful as "screening" tests. While no one test by itself reaches a high level of prediction, a combination of the tests would considerably enhance their discriminative value. In clinical studies we have found that while the Dark Vision test is particularly discriminative with respect to anxiety states, the Ranking Rorschach test is particularly discriminative with respect to hysterics. Differences in selectivity of this kind may account for the fact that such correlation as we have found between the various tests have usually been rather small; they also argue in favor of the use of several different tests in combination. We therefore put forward the whole battery as a useful measuring instrument for the general personality trait of "neuroticism" (2).

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# CHINESE PILOTS' ATTITUDES TOWARD WAR

YUN EN T'AN

The present study is based on the results of a test given to a group of Chinese pilots. The test used was the author's War Attitude Scale (3, 4, 5) constructed in 1938 at the Institute of Educational Research, National Sun Yat-sen University, Canton, China.

The scale was constructed by applying the Thurstone technique. It consists of two forms, namely Forms A and B, the former of which was used in the present study. The coefficient of reliability of the scale is  $.715 \pm .01$ , secured through the split-half method for 56 statements, given to 228 tested persons, most of whom were college students. With self-rating as a criterion, the validity was found to be  $.612 \pm .03$ .

Several studies have been made to analyze the relationship between attitudes toward war and success in military training. However, no such study has been made directly on the war attitudes of military personnel. Thus, the purposes of the present study are as follows:

1. To study the war attitudes of military personnel, namely, Chinese pilots.
2. To compare the results of the test given in 1943 with the results of the test given in 1938 by the author, and,
3. To ascertain the relationship between the war attitudes of the Chinese pilots and their flying ability.

## THE PRESENT GROUP AND THE 1938 GROUP

The results of the author's study of the 1938 group have been reported twice in Chinese (3, 4), abstracted in English (5) and summarized in an article by Dudycha (1). It is necessary, therefore, only to compare here the scores made by the two groups.

The criterion for grouping the pilots who took the test is as follows: those whose scale value lies between 7-8.9 may be said to approve war, those from 5-6.9 to be near an approval of war, 3-4.9 to be neutral, 1-2.9 to be near a disapproval of war, and 0-0.9 to disapprove of war.

The mean scale value for the 1938 group is 5.31 with a SD of 1.05; that for the 1943 group is 5.85 with a SD of .43. Considering the reliability of the difference, it is statistically sound to conclude that the 1943 group is less inclined toward "pacifism" than is the 1938 group. It may be seen in Table I that 95% of the 1943 group are favorable or strongly favorable to war, whereas in the 1938 group only 67.9% are favorable toward war.

TABLE I  
COMPARISON OF 1938 GROUP AND 1943 GROUP

Scale Values	Percent 1938 group	Percent 1943 group
0-0.9	0.0%	0.0%
1-2.9	3.9%	0.0%
3-4.9	28.2%	5.0%
5-6.9	65.3%	95.0%
7-8.9	2.6%	0.0%

During the process of training and several months after the test was given to the 1943 group, the pilots were divided into three groups: those assigned to single engine training, those assigned to twin-engine training, and those elimi-



nated from further flying training either in the beginning of the flying period or during the OTU training. The question now arises: to what extent did the attitudes of the pilots toward war contribute to their being placed in their respective groups? Are the eliminated pilots more inclined toward "pacifism" than the others? Are those in the single-engine or pursuit group less pacifically inclined than those in the twin-engine group?

The mean score for the single-engine group with 27 cases is 5.87 and for that of the twin-engine group with 25 cases is also 5.87. The SD for the former is .41 and the latter is .32. Statistically, the difference is not significant.

The eliminated group includes disqualified pilots. The author first believed that the pilots in this group were more inclined toward "pacifism" than those in the other groups. However, as the result shows there is no more nor less "pacifism" in this group than in the others. The mean score for this group is 5.82 with a SD of .50.

The reliability of the difference in the mean score between the eliminated group of the 1943 and that of the 1938 group is statistically significant. There is less "pacifism" in the former than the latter.

### WAR ATTITUDE AND FLYING ABILITY

The materials collected to study the war attitude and flying ability came from two sources: (1) The mean score of the eliminated group and (2) the average flying rating grades that were obtainable during their basic and operational training.

The flying ability is based on the flying rating of the pilots by their flying instructors. The author checked the flying record of the whole group. He found only 29 cases with flying grades available for the present study. Correlating the flying grades, which were numerically stated, with the mean score of the war attitude test, it gave a result of an  $r$  equal to .16.

The mean score given for the eliminated group, as stated above, was 5.82. If the assumption that the eliminated pilots were more inclined toward "pacifism" because of their inferior flying or vice versa is correct, their mean scores should have been less according to the grouping criterion. However, as statistics show, their mean scores showed no less "pacifism" than those of the other groups. Thus, considering these findings, the author comes to the conclusion that the war attitude factor does not interfere with their flying.

With the results that were obtained from the two sources given above, a general conclusion might be drawn that the war attitudes of this group of Chinese pilots have practically no relationship to their flying ability.

### DISCUSSION

In the author's 1938 group, 67.9% of the students were favorable or strongly favorable toward war. The main factor that had contributed to this attitude was the fact that China was at war and that the students had either seen war or had seen bombing of cities or had seen sufferings of innocent women and children of the war zones.

The present group, with 95% favorable toward war, evinced less "pacifism" than the 1938 group. The contributing factor, as estimated by the author, is that the present group is a more homogeneous group. One hundred percent of them have had military training and actual experiences both in the army and air force. With this training and experiences they have developed a strong and positive attitude toward war. This might be the very fact that caused the difference between the 1938 group and the present group.



American psychologists have made many studies of the war attitudes of youth as summarized in Dudycha's article (1). An article by Sherman (2) reported the attitudes toward the war effort of 7,000 Chicago youths of high school age. However, no study has as yet shown great proportion of the subjects with an attitude highly favorable toward war; even though some studies used boys who were in military programs, they nevertheless show no evidence of strongly favorable attitude toward war. Sherman's study, made after the United States entered the war, showed only 56% of the youth favorable toward war (included mildly favorable, favorable, and strongly favorable).

When the results of the American studies are compared with the author's findings, it is believed that the contributing factors to the difference were as follows:

1. That the American group had had no direct contact with the war condition, even though some of the students had taken military training.
2. That they are in a more prosperous and peaceful social milieu and have a minimum of opportunities to visualize the tragedy of war, and,
3. That they are less politically conscious.

The lack of a significant relation between war attitudes and flying ability is interpreted by the author as follows:

1. That the testing dates and flying rating dates were too widely separated. There was about a ten months lapse of time in between. The time and place might be the factors that have affected the results.
2. That the attitude factor has nothing to do with performance.
3. That the test does not purport to predict war attitudes.
4. That the cases studied were statistically insufficient.

#### SUMMARY

1. Of the Chinese pilots tested in 1943, 95% were favorable toward war, with only 5% in the neutral category.
2. The author's 1938 group when compared with the present (1943) group was more inclined toward "pacifism."
3. When war attitudes are correlated with flying ability, no statistically significant results are obtained.
4. No significant differences were found between the single-engine group, the twin-engine group and the eliminated group.

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## PSYCHOLOGY AND THE WAR: NOTES

The *Committee on the Relocation of Military Psychologists* of the Military Division of the APA reports several activities in the interests of psychologists in the military service. A questionnaire designed by the Chairman of the Committee (Lieut. Steuart Henderson Britt, USNR) has been mailed to every psychologist and psychologist-in-training who is or has been in uniform, in order to obtain specific data on the history of the utilization of psychologists in the military service, and on the courses and instruction in psychology desired by those planning to return to college and professional school.

All those who reply that they plan to continue their education are receiving a digest of pertinent materials regarding provisions for financing their education; this digest was prepared by Lt. (jg.) John G. Darley, USNR, and Capt. Hugh M. Bell, AUS. In this connection it is believed that the sections of the "G.I. Bill of Rights" covering re-employment will hold for psychologists on leave of absence from academic institutions and that their colleges are obligated to take them back at the conclusion of their period of military service. The Committee has found that the American Association of University Professors is following this problem closely, although no test case has arisen.

The Committee has also kept in touch with various officers in charge of both Army and Navy programs in psychology, to be informed of the demobilization plans in these programs. Evaluations of military service in psychology will be made by cognizant officers in each program, and records are being assembled for this purpose now. As an example, special forms have been developed by Col. John C. Flanagan, AUS, in order to develop suitable records for ready reference in answering inquiries and making recommendations based on evaluations of work in the Aviation Psychology Program of the Army Air Forces. These forms are adaptable for use by the Office of Psychological Personnel.

The Committee has also made sure that certain investigations carried on by other non-military committees have contained adequate references to the questions and rights of returning servicemen; and has answered specific inquiries of psychologists in the service. All correspondence should be addressed to the *Chairman of the Committee on the Relocation of Military Psychologists*, c/o Office of Psychological Personnel, 2101 Constitution Avenue, Washington 25, D. C.

*Transfer of Clinical Psychological Services from the Adjutant General's Department to the Medical Department.* The close functional relationship between psychiatry and clinical psychology has been repeatedly stressed during World War II. As a result of the final recognition of this fact, and the strong desire to perpetuate this relationship in the Post-War Army, the Office of the Chief Clinical Psychologist, Classification and Replacement Branch, AGO, has recently been transferred to the Surgeon General's Office, and Lt. Col. Morton A. Seidenfeld assigned there as Chief, Clinical Psychology Branch, Division of Neuropsychiatric Consultants. Capt. L. I. O'Kelly has been designated Assistant Chief of the Clinical Psychology Branch.

In addition to moving the central offices over to the Surgeon General's Office, provision has been made for the detail of all clinical psychologists now serving as officers into the Medical Administration Corps. This will permit an increase in the effectiveness of their utilization in medical installations, where they will be under the direct control of the Medical Department.



## BOOK REVIEWS

LEIGHTON, ALEXANDER H. *The governing of men*. Princeton: Princeton University Press, 1945. Pp. xvi+404.

In the spring of 1942 the United States Government established ten Relocation Centers in the West and Middle West and sent to these centers all of the approximately 110,000 Japanese who had lived in the Pacific coastal areas. The government proposed to develop genuine communities for these people and to train them in self-government and economic independence. It adopted further the policy of establishing in one of these centers, located at Poston, Arizona, a research unit in "social analysis," with two major objectives: (1) aid to the administration of the project through studies of the behavior of the evacuees, (2) advancement of the understanding of the social dynamics of displaced communities in general, which might be useful in the governing of occupied territories.

Lt. Commander Leighton, a psychiatrist with experience in applied anthropology, came to the center in its early days and for more than a year directed the unique research effort to appraise the forces operating during the inception and growth of a new society. This book is an account of this work, primarily in terms of its bearing upon the problems of government of occupied areas. It is written therefore mainly for the non-scientific reader, although there is a lengthy appendix which records the technical history of the project, including the conceptual framework, the methods and the types of results secured.

Although non-scientific in presentation, Leighton's book is a valuable scientific document, both as a contextual analysis of the growth of an unusual community and as an exhibit of the methodological state of the emerging science of social anthropology. It is presented in two parts, the first entitled *The Story of Poston*, the second, *Principles and Recommendations*.

The nature of the situation, as well as Leighton's psychiatric background, probably determined that the first part would assume the form of a "case history." For the community was in process of continuous change due to external and to internal stresses, with the result that no fixed program of study could be followed under uniform conditions. There was Washington with its bureaucratic modulation of the governmental framework, which often brought specific regulations into conflict with stated general policy. And within the center there was the social ferment resulting from the disruption of the previous organization of Japanese-American society and from an administration which in its lower levels exhibited intense anti-Japanese feeling. Leighton presents a skillful and interesting picture of this society's trial-and-error struggle towards structural definition, with special attention to the successful effort to achieve a measure of self-government. There is very little of explicit conceptual formulation in this chronicle of events, but he seems to have brought the essential social forces into clear relief. At the end of this section these forces are reduced to nine major themes which, in combination, are held to be the essential determinants of the conflict and adjustment described. The level of description is fortunately social not "psychiatric" in character.

The *Principles and Recommendations* are based upon Leighton's conviction "that in the Relocation Camp experience my hands groping blindly below the surface touched here and there on a real body of constants and laws in human living." The confession of "blind groping" sounds somewhat ironic in the face



of the formidable list of 58 principles and 142 recommendations which are presented under these headings: (1) individuals under stress, (2) systems of belief under stress, (3) social organization under stress. Aside from the dimensions of the learning task set for the prospective governor, there is the triteness and essential duplication to be expected in such an exercise of verbal refinement. Furthermore, the formulation of general rules of government apart from a political context can produce serious incompatibilities. Leighton recommends, for example, that a governing body integrate itself into the prevailing patterns of authority in the community. Whatever our present practice in Germany and Japan, this principle is at variance with our stated political aims.

The emergency pressure for immediate publication, together with the practical objectives, prevented Leighton from appraising his material systematically in the light of research and concepts from related scientific fields. As a result the conceptual frame of reference is somewhat "provincial" in nature, and he takes occasional liberties in psychological explanation, viz: "fear of isolation is probably another very basic and innate tendency." In the general interest of social science, therefore, one hopes that the task of systematic analysis and integration will be carried forward in later studies. The author's sensible and sensitive appreciation of the unique pattern of social relations present in this relocation center suggests that such a development would yield rich scientific returns.

Vassar College

LYLE H. LANIER

MURPHY, G. (Ed.) *Human nature and enduring peace*. Third Yearbook of the Society for the Psychological Study of Social Issues. New York: Houghton Mifflin, 1945. Pp. xi+475.

This third Year Book of the Society for the Psychological Study of Social Issues not only lives up to the promise of its predecessors, but in many ways exceeds them as an excellent, fairly popular summary of what psychology has to offer for the field in question. Like the other books this one is a symposium with contributions from many hands, this time from not only psychologists, but sociologists, political scientists, economists, anthropologists, newspaper correspondents and even men of affairs. The difficulty in most symposia, which was also shared to some extent in the previous Year Books of the Society, namely that the individual contributions overlap to a great extent and that they vary decidedly in completeness and in stylistic niveau, has been overcome by Doctor Gardner Murphy in a rather novel and very successful fashion. Murphy as editor, writes Part One (the introductory section, *The Impulse to War*) and Part Four (the summary, *World Order is Attainable*.) To the reviewer these two sections stand out both for the brilliance of their presentation and of their organization. Not only does Murphy begin and end the book but he inserts correlating paragraphs between the contributions of all of the other writers so that at times one forgets that this is a work of many hands. In passing, let it be said that Gardner Murphy is far too modest about his own contribution to this work. Actually, the title page should read: Edited by Gardner Murphy and written by Gardner Murphy, with the collaboration of the other contributors.

As is now generally known, the purpose of these Year Books is to direct psychological research toward contemporary problems and to make the results of such research available to citizens outside of the psychological profession. The problem for consideration in this Year Book is certainly the most important which faces us today. Although it is obvious to nearly everyone now that psy-



chological factors do enter into the problem of the genesis of wars and the problem of keeping the peace, it is also obvious that psychology must be augmented by economics, sociology and political science, and what is even more important, by the practical acts of the powerful of the world if the peace is to be kept.

So from the first, Murphy calls not only on psychologists but on members of the other pertinent professions to discuss the problem. Neither the professional psychologist nor the professional sociologist, economist, and so forth, will find in this book much that is new to his own particular field, but the psychologist should read it, and the sociologist and others also, for the integration of his field with the various other disciplines. Finally, of course, in accordance with the aims of the Society, the book is addressed to the larger audience of the educated citizenry. It is hoped that it will have a wide circulation.

In Part One, *The Impulse to War* in six succinct and charmingly written chapters Murphy points out just what psychology can and cannot do, debunks the various one-sided causal theories regarding the beginnings of war, and gives us a preliminary view of what might be considered an adequate strategy against war. This argument cannot be even abstracted in the compass of a brief review, but it can be said that it is considered and cogent.

In Part Two, *The Obstacles to Peace* are discussed by Curt Bondy, Clarence H. Leuba, Hans Margolius, Rudolf Arnheim, Fritz Schreier, Charlotte Bühler, Owen Lattimore, Audrey Menefee, Pryn's Hopkins, Seth Arsenian, Leo Gershoy, Sir Norman Angell, Alice Thorner, John Gardner, Sidney S. Harcave, Edgar Snow, James L. Graham, Daniel Katz, Sylvanus M. Duvall, and R. N. Sanford. This section is far from a Pollyannalike optimism but it cannot be considered downright pessimistic. We at least now know what some of the barriers are, and the type of political, educational, religious and psychological program which must be overtaken to overcome them.

Part Three, *A Positive Program* has contributions by Quincy Wright, Alfred W. Jones, Horace B. English, R. M. MacIver, Sheldon Korchin, Gordon W. Allport, Lawrence K. Frank, Harry Overstreet, Ross Stagner, William J. Carr, Jane Gibson Likert, Ralph Gundlach, Edgar Snow, Eugene Lerner, Goodwin B. Watson, Margaret Mead, Paul M. Limbert, Kurt Lewin, Ronald Lippitt, Charles Hendry, Alvin Zander, John R. P. French, Jr., David Kuselewitz, Lee Emerson Deets, Seward Hiltner, Luman Shafer, Kenneth B. Clark, George H. Seward, Jerome S. Bruner, Gerhart Saenger, H. H. Remmers, Harold Lasswell, Ernest Kris, Houston Peterson, Alvin Johnson, and Lawrence K. Frank. This section gives certain positive suggestions with regard to keeping the peace. The goals are clear. We must maintain the peace; we must have freedom; we must have an expansion of the democratic processes, and we must not substitute class war at home for international war abroad.

In Part Four, *World Order is Obtainable* Murphy subsumes the argument and the book ends with a brief chapter entitled *A Note On Insecurity* by Ralph K. White and the now very well known psychologist's *Manifesto on Human Nature and the Peace*. In a field where to the professionals and even to the laity there often seems more disagreement than agreement, it is very gratifying indeed that on these really vital issues such unanimity of opinion was obtained amongst the members of the American psychological societies.

The cautious reviewer usually adds a few words at least of criticism at this point. Concerning this book, appearing at the time when it did, it is almost impossible to do this. There are only a few minor points. While it is true that some of the individual contributions were evidently seriously thought through and well worked over before they were sent to the editor, others bear the earmarks of simple rather freely dictated statements. Despite the editor's at-



tempt to present the material in a language which would be universally understood by the educated laity, not a few contributors still fall back into our almost unspeakably awkward technical lingo. The book also is a small one as such books go, and with the whole trend in publishing toward mass editions priced at very reasonable rates, \$3.50 for this volume seems exorbitant, particularly with regard to the audience to whom it is addressed. The bibliography is fairly complete, but certainly a few outstanding items are omitted and since the bibliography is not classified nor given with any critical comments it will be of small use to the lay reader.

This review is being written on August 14, 1945. It is a sad commentary on our society that we cannot now feel only relief that the greatest war in history is over and view the future with equanimity. But remembering the return to "normalcy" after 1918 it is perhaps a hopeful sign that we are concerned with the organic structure of our whole social living and that we do realize big changes must be made. It is, of course, impossible to estimate just how much research and writing influence political events. But as Slochower states in his recent book *No Voice is Wholly Lost*, the reviewer can only hope that the voices of Doctor Murphy and his collaborators will not be lost at all, but will gain the audience of the educated citizenry for whom it is intended and the ear of the politically powerful for whom it has so much to say.

Beverly Hills, Calif.

J. F. BROWN

DORCUS, R. M. & SHAFFER, G. W. *Textbook of abnormal psychology*. (3rd. ed.) Baltimore: Williams & Wilkins, 1945. Pp. xv+547.

The third edition follows six years after the second. It contains 365 new references and 52 more pages of text. Its organization, however, is not materially changed. There is the same number of chapters with the same—or virtually the same—titles, arranged in the same sequence; practically all of the old content remains, and assimilation of the new is largely by insertion rather than reorganization.

There is a more extensive treatment of psychoanalytic concepts, especially with respect to their evaluation in the light of recent experimental evidence, and a perceptible inclusion of new material on incidence, etiology, and experimental therapy for various disorders. The greatest single modification, however, is in the chapter on treatment by physical and chemical assault (formerly chemical therapies) which is largely rewritten, comprises 10 more pages, and accounts for over a third of the new reference material. It contains an excellent discussion of shock therapies—metrazol, insulin, and electric—and a commendable section on prefrontal lobotomy. New topics treated elsewhere in the book include aniseikonia, air, sea, and motion sickness, psychosomatic medicine, experimental neurosis, Wechsler's conceptions of intelligence and its measurement, factor analysis, and psychological deficit. There is an occasional reference to Rorschach material.

The book is a rich source of new reference material; its 365 new references, which have been added to the 468 previous ones, are up to date and fairly inclusive, although there are lacunae, as for example, a scarcity of references to projective studies. Coverage of the new, which comprises something over ten percent of the text space, tends to be bunchy; one may read a good many pages of the old—in one instance a whole chapter—without encountering anything new, and where the new does appear it is likely to do so in concentrated doses.



Since the revision assimilates an appreciable amount of new and up to date material, and yet retains the previous plan of organization and practically all of the previous content, its welcome by those who have found former editions satisfactory is predicted; its acceptance by others is more problematical.

WALTER C. SHIPLEY

Wheaton College, Norton, Mass.

KLEIN, D. B. *Mental hygiene, the psychology of personal adjustment*. New York: Henry Holt, 1944. Pp. xiii + 498.

Here is a distinctly better than average mental hygiene text. The author well achieves his goal of a book for non-professional readers, which does not sacrifice basic accuracy. The treatment is admittedly selective, based on the author's experience, in terms of problems most likely to be met in the ordinary course of events. In the reviewer's opinion, relative emphases are generally well placed. For example, Klein is singularly free from fixed ideas with respect to causes of disorder or factors in improvement. He deals far more with the general conditions for and principles of improvement of adjustment than with therapy for specific difficulties. There is, thus, only passing resemblance to the more common treatment of mental hygiene classification and description of disorder, with recommended modes of therapy.

The book differs in other respects from more conventional patterns of writing in its subject. Dr. Klein faces objectively certain phenomena which many writers have avoided as improper subject matter for scientific writing. An example is his treatment of the significance of conscience and ethical standards in mental conflict, in which he interprets the traditional vocabulary of conscience in terms of incentives, motivation, and the concepts of the id, ego, and superego. Although Freudians may object to over-simplification of the latter, the discussion is provocative and offers helpful material on how adjustment to social codes relates to personality integration. There is also a stimulating re-interpretation of the function of repression in the solution of mental conflicts. The discussion of motive recognizes that the simple physiological needs are far less likely to produce the common difficulties and conflicts of life than the more complex, derived needs. There are excellent chapters given to the roles of social and economic status and family environment in promoting or hindering mental health.

In the reviewer's opinion, the treatment of the Wickman-Stogdill studies of child behavior is particularly commendable. The majority of psychological and educational texts present the findings of these studies uncritically. Dr. Klein, cognizant of Goodwin Watson's critique of these studies, points out some theoretical implications arising from his own thinking and offers a defense of teachers and parents as practical mental hygienists.

The author's style is discursive, easy to read, and a bit rambling. The student with a passion for compact, internally consistent and rigidly systematic theory will criticize this volume sharply. The eclectic will no doubt be pleased with the author's easy utilization of concepts from Freud, Lewin, Pavlov, Landis and Page and many other sources.

The text is primarily didactic, but it avoids homily, and includes reference to a wide body of research papers as well as to the literature of opinion. Tabular and graphic materials however are almost non-existent.

DALE B. HARRIS

Lieut., USMCR, U. S. Naval Hospital,  
Philadelphia 45, Pa.



WEISS, E. & ENGLISH, O. S. *Psychosomatic medicine*. Philadelphia and London: W. B. Saunders Company, 1943. Pp. xxiii+687.

This volume's scope is aptly described in the subtitle: *The Clinical Application of Psychopathology to General Medical Problems*. The term psychosomatic medicine is used in various ways. Some writers limit it to specific types of illnesses of known psychogenic origin but with actual physical disease. Others extend it to apply to functional disorders, not including the conventional neuroses and psychoses, however. Still others, including the authors of this text, subsume an even larger area of medicine, indeed the whole of medicine, including psychiatry, under the term. The following quotations make clear the scope of the term in the minds of the authors:

The term psychosomatic illness has not yet been exactly defined or generally accepted. Some physicians use the term psychosomatic illness synonymously with psychoneurosis and it is true that psychoneuroses and psychoses are often psychosomatic illnesses. Others restrict its use to disorders such as migraine, essential hypertension, and asthma, in which the vegetative nervous system seems to be fundamentally involved. We use the term in a wide sense to cover not only the physical manifestations of neurotic and psychotic disorders; the diseases of the vegetative nervous system; but also, and most importantly, the great variety of mixtures of psychological and structural disorders which make up the bulk of the practice of medicine (548). . . . Psychosomatic medicine at the present time embraces the neuroses plus an extension of our knowledge of neuroses to the psychopathology of other conditions previously thought to be in the realm of purely physical medicine (43). . . . All medicine is psychosomatic medicine (41).

The concept of psychosomatics leads to an approach in medicine that is radically different from the purely organic attitude.

The day is near at hand for the final outmoding of the "either-or" concept (either functional or organic) in diagnosis and to place in its stead the idea of how much of one and how much of the other, that is, how much of the problem is emotional and how much is physical. This is truly the psychosomatic concept in medicine (7). The diagnosis of functional illness must be established not simply by the exclusion of organic disease but on its own characteristics as well. In other words, neurosis has its own distinctive features to be discovered by personality study. . . . This applies not only to problems in which evidence of structural disease has been excluded but also to patients who present evidence of physical disease and emotional factors. . . . The either-or concept in medicine must be displaced by the idea of how much of the problem is psychological and how much of it is physical and what is the relationship between the two (164-165). One of the great mistakes in medicine is to relegate the diagnosis of a functional disorder to the background, to be considered only after physical diseases have been excluded (302). The fundamental error of modern medical science has been the divorce of both (medicine and surgery) from psychiatry (15). (This division has resulted in many unnecessary operations; the surgeon) was deceived by his organic training into thinking that he could cut out of the body a pain that had its origin in the emotional life. (190).

Psychosomatic medicine thus demands an approach to the patient that stresses the importance of personality study, or social history taking, involving a study of the whole person, not systems.

. . . To study patients . . . simply as physiological mechanisms and treat them by mechanical measures, without making some effort to understand the emotional makeup, is a very one-sided and inadequate attempt to deal with the disorder. . . . Indeed, we



venture to suggest that the time is approaching when the physician will consider the neglect of the psychological study just as serious an omission, in the total study of the patient . . . as the failure to x-ray . . . a patient (230-231).

It therefore becomes, in the opinion of the authors, the function of the general practitioner to attempt psychotherapy with the milder cases of psychosomatic disorder, and, in the more serious cases, to refer the patient to a psychiatrist. "It is not sufficient to tell a patient that the trouble is not organic and that he should go out and do his job" (207).

In line with this reasoning, the authors have written a book to assist the general practitioner who perforce is practicing psychosomatic medicine. Chapter I consists of a summary-survey, in which three groups of psychosomatic problems are delineated: (1) those in which no organic disease is present; (2) those in which organic factors are present but not sufficiently serious to account for the symptoms; and (3) diseases of the vegetative nervous system (migraine, asthma, essential hypertension, etc.) generally considered in the realm of physical disease but in which psychic factors are or may be important in etiology and treatment. Chapter II, *Personality Development and Psychopathology*, outlines the psychoanalytic theory of development, following Abraham and other psychoanalysts, and includes brief discussions of the common neuroses and psychoses. Then follow a series of chapters on the psychosomatic disorders of the various systems—cardiovascular, gastrointestinal, endocrine, genito-urinary, respiratory, and the central nervous system. A chapter on the special senses, the eye, the ear, the skin, and one on special topics—allergy, dentistry, arthritis—are included. A brief chapter on psychosomatics—or psychoneuroses—in military medicine is inserted, without much justification, at this point. The remainder of the book, with the exception of a brief concluding chapter on training in psychosomatic medicine, is devoted to therapy.

The first chapter of the treatment section gives a good discussion of the psychosomatic history, which is similar to the usual psychiatric history, and a discussion of therapy in the common neuroses and psychoses, is apparently included because of the authors' belief, that psychosomatic medicine includes the common neuroses and some psychoses, and that psychosomatic disorders of the various systems can be classified under the usual neuroses, i.e., disturbances of the cardiovascular system for example can be diagnosed as anxiety neuroses with cardiac manifestations, a method which the authors prefer to the use of the term "cardiac neurosis." Another chapter discusses "normal" problems in psychotherapy, from feeding difficulties in infants, through adolescence and marriage problems, to work adjustment and the problems of ageing and senescence. Much excellent advice is condensed in this chapter. The final chapter on therapy deals with special procedures, and treats of various therapeutic measures, classified according to Menninger's division into suppressive and expressive therapy, the latter including a discussion of psychoanalysis.

The section on therapy is not closely articulated with the preceding chapters. There appears to be little connection between the discussion of psychosomatic disorders and the treatment methods outlined. These methods are those used with the common neuroses, and in common with most psychiatric texts, the section on treatment is rather barren. In the cases presented in the earlier part of the book, the discussion of treatment is disappointing; the comment frequently appearing that treatment was not possible, or that the patient



could not be followed. The book is likely to be of little practical use to general practitioners in treating psychosomatic disorders psychotherapeutically.

In general, the authors have done an excellent job of presenting the concepts of a field which Cobb has called the "borderlands of psychiatry," and which might also just as well be called the borderlands of medicine, and in discussing the various manifestations by systems. Omissions of reference to the literature in certain areas, such as the work of Wolff and Wolf in peptic ulcer, could be pointed out. However, in a work of such an extensive nature, everything in the literature could not have been included. While not as rich nor as stimulating as Dunbar's *Psychosomatic Diagnosis*, which analyzes extensively the personality patterns and characteristics of the various psychosomatic disorders, it is a valuable reference for physicians and psychologists alike.

The book has an excellent index, a list of fifteen selected readings, and references, arranged by chapters at the end of the text. The references are not extensive, however, and by no means constitute a bibliography of psychosomatic medicine. They follow the annoying medical practice of not listing the title of the article.

2nd Lt., AGD

C. H. PATTERSON



## NOTES AND NEWS

HOWARD DANIEL MARSH, retired professor of psychology and former chairman of the department, City College (New York), died, August 26, in St. Petersburg (Fla.). Dr. Marsh, who was seventy-four years old at the time of his death, had served as an instructor in philosophy and psychology (1906-07), Ohio Wesleyan University, and at City College as instructor in psychology (1907-17), assistant professor (1917-32), associate professor (1932-39), and professor and chairman of the department (1939-41). Dr. Marsh's published works include "The Diurnal Course of Efficiency," "Sex Differences in Fast-ing," "The Psychology of Work," and many articles in technical journals. Dr. Marsh was a Life Member of the APA.

CHARLES SPEARMAN, professor emeritus of psychology of the University of London, died on September 17 at the age of eighty-two years.

WALTER BRADFORD CANNON, George Higginson professor emeritus of physiology, Harvard Medical School, died, October 1. Dr. Cannon would have been seventy-four years old on October 19. For many years Dr. Cannon was a member of the APA.

A. S. CLAYTON, professor of philosophy and psychology, Talladega (Ala.) College, has been appointed associate professor of psychology and education, Western Illinois State Teachers College (Macomb).

Tulane University has announced the following promotions in the department of psychology: AGNES THORSON LANDIS to assistant professor, and CECIL W. MANN, assistant professor, to head the University's veterans' guidance office.

SEYMOUR B. SARASON, chief psychologist at the Southbury Training School, has been appointed assistant clinical professor in the department of psychology at Yale University.

MILDRED SAUPE, formerly director of education, Missouri State School for Epileptics and Feeble Minded, has been appointed professor of psychology at the Missouri Valley College (Marshall).

ELMER B. SIEBRECHT, formerly of New York University, has assumed his new duties as dean and associate professor of psychology, Gustavus Adolphus College (St. Peter, Minn.).

WILLIAM U. SNYDER, formerly of Ohio State University has taken a position as assistant professor in psychology at Pennsylvania State College, where he will continue his work in the area of clinical psychology. In August he directed a one-week institute on the counseling of personal problems in industry, held at Ohio State and attended by twenty personnel officers from Ohio industries.

GORDON L. WALLS, of the scientific bureau of the Bausch and Lomb Optical Company, Rochester, N. Y., has been appointed as research associate in the department of psychology of the University of Rochester for one year. Dr. Walls plans to continue his work with the optical company.

At the Agricultural and Mechanical College of Texas (College Station), G. B. WILCOX has been appointed head of the department of education to



which the department of psychology has been attached. WALTER V. VARVEL has been advanced to a professorship in psychology.

Michigan College of Mining and Technology (Houghton) has announced that the department of mining and civil engineering has been divided and that a department of engineering administration has been created to include "work previously assigned to the department of economics and government and to that of psychology and sociology."

*NRC Fellowships.* The National Research Council announces that fellowships in mathematics, astronomy, physics, chemistry, geology, paleontology, physical geography, zoology, botany, agriculture, forestry, anthropology and psychology will be available for the year 1946-1947. These fellowships are awarded as a rule to persons under thirty-five years of age who are citizens of the United States or Canada, and who have met all the requirements for the doctor's degree. Applications must be filed on or before December 31, on forms obtainable from the *Secretary of the Fellowship Board in the Natural Sciences, National Research Council, 2101 Constitution Avenue, Washington 25, D. C.* A handbook describing the fellowships—stipends, conditions and tenure—will be furnished upon request.

*Graduate Fellowships at Michigan for Veterans.* The Executive Board of the Graduate School of the University of Michigan has established a number of special fellowships for exceptionally promising graduate students whose studies have been interrupted by the war. The stipends will usually be \$1,000 less tuition, but adjustments will be made in accordance with the financial circumstances of the successful applicant. Applicants must have the active support of the department in which they wish to study, and if not previously enrolled in the University, must furnish full transcripts of their work. Evidence of fruitful experience during the war period should also be presented. Interested applicants should write to the *Dean of the Horace H. Rackham School of Graduate Studies, Ann Arbor, Michigan.* Registration for the Fall term of the University opens October 29, 1945, and for the Spring term, February 28, 1946.

*Assistantships for Graduate Students in Educational Psychology at Syracuse.* Two \$1,500 assistantships beginning January 1, 1946, are available to advanced graduate students in educational psychology in the school of Education at Syracuse University. One assistant will work in the area of child psychology and the other in the area of adolescent and adult psychology. Assistants may carry up to 9 hours of graduate work and will have the opportunity to carry on research for their Doctor's degrees. Prospective candidates should make application at once to DR. MAURICE E. TROYER, *Chairman, Evaluation Service Center, Syracuse University, Syracuse 10, New York.*

*Executive Secretary, American Psychological Association.* DAEL WOLFE has been appointed Executive Secretary of the American Psychological Association. He will assume his new duties on January 1, 1946. The central office of the APA will be located in Washington, D. C. and will continue the functions now carried out by the Secretary, the Business Manager, and the Office of Psychological Personnel. Dr. Wolfe was formerly associate professor of psychology at the University of Chicago, and during the past two years has been on leave for work with the Applied Psychology Panel, National Defense Research Committee.



# Psychological Bulletin

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## NOTICE

### BUSINESS MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

Columbus, Ohio, December 27-29, 1945

*To Fellows and Associates of the American Psychological Association:*

A business meeting of the American Psychological Association will be held December 27-29 at the Fort Hayes Hotel, Columbus, Ohio. Members of the new Council of Representatives, and officers of the various divisions will meet to plan the organization of the divisions and to transact other business. Several of the working committees of the APA also plan to meet at the same time. There will be no program of papers, but any members of the APA who are interested are invited to attend meetings of the Council. Reservations at the hotel may be obtained as long as they are available from DR. DAEL WOLFLE, *Executive Secretary*, 2101 Constitution Avenue, Washington 25, D. C. Members who wish to propose items of business should inform the *Recording Secretary* as soon as possible.

DONALD G. MARQUIS, *Recording Secretary*



## EDITORIAL ANNOUNCEMENT

With this issue, the *Psychological Bulletin* completes one phase of its history and passes into another. For forty-two years it has served psychology in a variety of ways, over and above its primary function as the journal of critical and analytic reviews. In the early Twenties it carried an abstract section, the predecessor of *Psychological Abstracts*. For some years, it has carried the Proceedings of the Association and its affiliated societies and, more recently, the Program of the Annual Meeting and the Presidential Address. In 1942 it established a "Psychology and the War" section for papers on the contributions of psychologists to the war effort.

The American Psychological Association will sponsor a new journal, *The American Psychologist*,\* to appear monthly beginning in January, 1946. As the professional journal of the Association, it will contain articles relating to the public services and professional activities of psychologists, the contributions of psychology to the war, the official papers of the Association, notes and news about psychologists, and other related materials.

After consideration of the future of the *Bulletin* and on the recommendation of the Committee on Publications, the Board of Directors has voted that the *Bulletin* return to its former status as the primary publishing medium for critical and analytic reviews of the scientific literature; that it appear on the first of the month in February, April, June, August, October, and December of each year; and that it change its format and makeup to conform to more modern practices. It also voted to continue the policy of sending the *Bulletin* to each member of the Association. While recognizing that a major portion of the 1946 volume will be devoted to publishing accumulated papers and meeting existing obligations, it instructed the editor during 1946 to make plans for a comprehensive review journal of value to all psychologists.

In line with this recommendation, the editor will be pleased to receive suggestions as to how the *Bulletin* can be made more useful. Such suggestions might well include areas to be covered, topics of papers, plans for rotation of reviews, etc. He would also be pleased to be informed of available existing reviews and to correspond with persons willing to undertake substantial reviews within a particular area. Because much of the war research was restricted, and because many psychologists and potential graduate students who were in the services were not doing research or writing, the review section of the *Bulletin* has been forced to operate on a somewhat casual basis since 1942, utilizing such manuscripts as were available and as met its standards. With the return to peace, plans can be worked out which will give some latitude for the acceptance of voluntarily submitted manuscripts, and at the same time provide for systematic coverage of the fields of psychology.

JOHN E. ANDERSON

\* For a more detailed description of this journal, see the report of the Committee on the Official Journal on pages 720 to 723 of this issue.



# APTITUDE TESTING FOR METALWORKING OCCUPATIONS\*

ELDRED F. HARDTKE

*War Manpower Commission, Minneapolis, Minnesota†*

## INTRODUCTION

The basic importance of the various metalworking occupations to the productive capacity of a nation has probably never been so forcefully demonstrated as it has been in the past several years. Both the earlier *defense program* and the more recent *war production program* presented ample evidence of the need for skilled and semi-skilled workers in the metal trades before full-scale production can get under way. Despite the fact that the United States is considered to be the most highly industrialized nation in the world, surprisingly little work (and much of that inadequate according to present standards) has been done to determine the aptitudes required of an individual for successful performance in occupations comprising the metal trades. A disproportionate amount of study appears to have been devoted to the clerical and sales occupations in the commercial field. This résumé with its appended bibliography is intended to call attention to a fertile field for aptitude studies and to provide a review of the pertinent studies reported prior to October, 1943.

The references reviewed are limited to those which investigated the aptitudes necessary for successful performance in the skilled metalworking occupations carrying occupational codes ranging from 4-71.000 through 4-95.999. Reference to Part II of the *Dictionary of Occupational Titles* (109, pages 80-87) will disclose that the following three-digit occupational groups are included under this classification of Metalworking Occupations:

- 4-71 Jewelers, Watchmakers, Goldsmiths, and Silversmiths
- 4-72 Occupations in Manufacture of Clocks, Watches, Jewellery, and Articles of Precious Metals
- 4-73 Engravers
- 4-74 Occupations in Electroplating, Galvanizing, and Related Processes
- 4-75 Machinists
- 4-76 Toolmakers and Die Sinkers and Setters
- 4-77 Filers, Grinders, Buffers, and Polishers (Metal)
- 4-78 Machine Shop and Related Occupations
- 4-80 Tinsmiths, Coppersmiths, and Sheet-Metal Workers
- 4-81 Molders
- 4-82 Foundry Occupations
- 4-83 Boilermakers
- 4-84 Structural- and Ornamental-Metal Workers
- 4-85 Welders and Flame Cutters
- 4-86 Blacksmiths, Forgemens, and Hammermen
- 4-87 Heat Treaters, Annealers, and Temperers

\* This paper is based on the introductory material contained in the author's thesis (34) submitted to the Graduate School of the University of Wisconsin in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

† On military leave.



- 4-88 Occupations in Mechanical Treatment of Metals (Rolling, Stamping, Forging Pressing, etc.)
- 4-90 Ore Dressing Occupations
- 4-91 Furnacemen, Smelters, and Pourers
- 4-92 Occupations in Production of Ferrous and Nonferrous Metals
- 4-93 and 4-94 Occupations in Fabrication of Metal Products
- 4-95 Inter-Industry Metalworking Occupations

The review of the literature presented below will follow, in general, the order in which the various occupational groups are listed above. Studies involving proficiency or achievement tests and oral trade tests are excluded, as also are studies of personality, temperament, and interests. Studies of occupational levels of intellectual capacity are not included unless the results obtained have been used to predict potentiality for success in a metalworking occupation.

### WATCHMAKING OCCUPATIONS

The only reported studies of watchmaking occupations are those by Candee and Blum (20) and Blum (14). Although the former does not include a statement of the specific jobs studied, the latter study, which is apparently a follow-up on the earlier work, indicates that the female employees studied were engaged in watch assembly work. The two tests used were the O'Connor Finger Dexterity Test and the O'Connor Tweezer Dexterity Test. The results obtained by these investigators indicated that the Tweezer Dexterity Test differentiated the employed workers from the general population better than did the Finger Dexterity Test, but it did not differentiate the superior workers from the mediocre workers as well as did the Finger Dexterity Test. In fact, the correlation between the Tweezer Dexterity Test scores and ratings obtained from the foremen was only .027 while the validity coefficient of the Finger Dexterity Test was .26. The low validities obtained were attributed to the unreliability of the foremen's ratings. While speed on the Finger Dexterity Test appeared to have some value in differentiating between superior and mediocre workers in the plant, that value was not as evident among the highest test scores as in test scores somewhat lower. On the basis of the test results obtained on the employed workers studied, critical scores were established on both tests for use in the selection of future applicants for assignment to these assembly jobs. The two tests used in this study were apparently selected because of O'Connor's (66) statements that high grades on his two dexterity tests indicated a potentiality for watch and clock work, including repairing, assembling, and other detailed jobs involved in watch manufacturing. Unfortunately, he did not present any supporting evidence.

### JEWELRY OCCUPATIONS

The only report of an aptitude study for jewelry occupations is the mere listing by Stead and Masincup (89, page 107) of a battery developed by the Occupational Analysis Section of the United States Employment Service for the semi-skilled occupation of Jewelry Assembler.

### MACHINE SHOP OCCUPATIONS

#### *United States*

By far the greatest amount of work on the development of aptitude tests for metalworking occupations has been carried on in the field of machine shop



work. This activity is probably a reflection of both the skill level of the occupations involved, and the rather extensive training and apprenticeship required of an individual before he is considered a fully qualified worker in this field.

*Machinist Apprentice.* In the United States, Link's work (54, pages 123-129) in this field, reported in 1919, appears to be the earliest. The reliability of the results obtained in this initial study may be questioned since none of the three groups studied included more than 12 subjects. However, despite these small samples, it is of interest to note that the results obtained were surprisingly indicative of the types of tests which were found to be valid in later studies by other investigators. Of five tests used, three showed a consistent correlation with the ranks assigned to the apprentices by their instructor and foreman on the basis of their ability to learn the prescribed work. These three tests and their validity coefficients for the first group of 12 subjects were: Form Board Test .81, Cube Test .75, and the Stenquist Mechanical Assembling Test .84. A correlation of .90 was reported between the combination of these tests and the criterion. The apprentices were also ranked by the instructor according to his opinion of them when they first came to the shop. These rankings correlated .28 with the combined test results. On the basis of this figure and others obtained on the other two groups, Link concluded that the trend of the validity coefficients varied directly with the length of time the apprentices had been in training. In a later study (55) Link reports the use of the above three tests in the selection of machine shop and toolmaker apprentices at the Scovill Manufacturing Company. The use of these tests by this company is also reported by Berry (9). Ratings obtained on 25 subjects produced the following validity coefficients: Form Board Test .40, Cube Test .33, and the Stenquist Mechanical Assembling Test .36.

*Tool-and-Die Maker Apprentice.* Crockett (24) reports a rather unsuccessful attempt to set up test standards for the selection of tool-and-die maker apprentices for the Burroughs Adding Machine Company. Although some of the tests used seemed to differentiate between the 27 apprentices and an unselected group of employees, they failed to distinguish between the best and the poorest apprentices when critical score levels were used. The negative results obtained were probably due largely to the highly subjective criteria of doubtful reliability, the low reliability of the tests used, and the small sample.

Drake (26) discusses the use of six well-known tests on 24 male applicants for apprentice training for journeyman tool-and-die makers. The applicants were ranked on the basis of the resulting combined test scores, and 9 of the top-ranking 12 who were recommended for an interview were hired. No indication is given of the validity of the tests used, nor of the basis for arriving at the composite scores. It is stated, however, that of five employed apprentices who had not been tested prior to employment, only one had test scores high enough to fall into the recommended group. This report is of doubtful value because of the sketchy data presented.

O'Connor (66) considers a good score on his Wiggly Block Test to be indicative of potentiality for tool-and-die making, all-round machining, machine setting-up and repairing, and structural iron and sheet metal work. He reports (66, pages 122 and 126) that 74% of all-round machinists with two or more years' experience make letter-grades of A or B on this test as do also tool-and-die makers and machine repair and set-up men. Similar letter-grades are held to be indicative of aptitude for welding and a variety of machine operations on drill presses, punch presses, and screw machines. The value of this test is



highly questionable in view of its reliability of .37 as reported by O'Connor. Remmers and Smith (79) have reported that 10 trials would have to be administered, instead of the usual 3 trials, before its reliability would approach .90. Despite their finding that the reliability of the Wiggly Block Test is too low to permit its use as a satisfactory tool for either group or individual vocational guidance, Remmers and Schell (78) report a validity coefficient of .62 obtained between this test's scores and semester grades of 60 students in a high school machine shop course.

Bingham (10, 11) presents a table of vocational norms containing the test scores made by 124 apprentice toolmakers at the Scovill Manufacturing Company on the seven subtests of the MacQuarrie Test for Mechanical Ability. He also presents (11, page 317) a table of intercorrelations obtained on six different test measures and schooling for 83 toolmaker apprentices at this same company. The validity coefficients obtained for these tests are reported by Pond (74).

*Machinist.* Short (87) suggests an inadequately standardized and non-evaluated test for general machinists for use by the Bureau of Public Personnel Administration. Tiffin (96) reports a study conducted by Graney (32) in which a correlation of .55 was obtained between the Purdue Mechanical Assembly Test and supervisors' ratings of machinists and machinists' helpers in one plant. In another plant, a correlation of .35 was found between the test scores and ratings of machinist apprentices by their instructors.

Arthur (7) unsuccessfully attempted to develop a battery which would reveal a potentiality for machine set-up work in a plant manufacturing heavy earth moving equipment. Most of the tests used, including O'Connor's Wiggly Block Test, were not sufficiently reliable to display an acceptable validity. Schultz (85) briefly describes several tests which reportedly classify workers or applicants into those suitable for training as (a) first class machinists, (b) semi-skilled machinists or mechanics, (c) bench workers or operators of simple machines, (d) unskilled workers, or (e) doubtful prospects for any work involving tools or machines. No reliability or validity figures are reported for these tests.

*Machine-Tool Operators.* Several studies have been conducted on machine-tool operators as contrasted with the all-round machinist. One of the earliest is that of Patten (68) who investigated the "engine lathe aptitude" of 60 subjects enrolled in a university course in elementary lathe practice. The criterion was a composite of a variety of accuracy measurements based on the blueprint specifications and the actual lathe work turned out. Of the eight test measures tried, five were found to give a multiple correlation coefficient of .55. Gleason (31) reports a continuation of the above study which produced a battery of four tests with a multiple R of .527.

Bennett and Fear (8) administered two paper-and-pencil tests and three apparatus tests to machine-tool operators working on turret lathes, precision grinders, milling machines, and Bullard automatics. The validity coefficients of these five tests ranged from .37 to .64 with a correlation of .59 for the unweighted combination of these tests. This correlation was increased to .67 for a weighted combination of two of the tests: Revised Beta non-verbal intelligence test and a hand-tool dexterity test, with individual validities of .37 and .46 respectively.

Ross (81) established critical scores on six tests to aid in the selection of machine-tool operator trainees. These critical scores were based on instructors' ratings of the trainees on a five-point scale. This investigator also reports that



the Revised Minnesota Paper Form Board Test and the Minnesota Spatial Relations Test did not give clear cut results for the establishment of critical scores. In describing the development of three of the Minnesota Mechanical Ability Tests, Anderson (5) reports that when scores indicating mechanical shop success and test scores were arrayed in a six-category classification it was found that the tests exactly located 50% of the cases, 45% were located one position away from their shop score, and only 5% were located two positions away. No mention is made of the content or extent of the "mechanical shop" training.

Tiffin (96) discusses a report on the testing done by the Western Electric Company (107), which is also reported by Hayes (38), on a variety of occupations including that of punch press operator. However, since there was no indication that these operators worked on metal materials, these studies will not be described. Tiffin and Greenly (97) also report a study of punch press operation and present norms for the evaluation of scores made by inexperienced and experienced operators on a miniature punch press. This work-sample test, which appears to be more of a proficiency trade test than an aptitude test, adequately distinguishes between the inexperienced and experienced operators.

Shartle (86) mentions work being done by the Occupational Analysis Section of the U. S. Employment Service on an aptitude study for machinist apprentices. Hardtke (33) discusses the use of three batteries in itinerant testing for the differential selection of potential machine-tool operators, machine shop trainees, and machinist apprentices. It is reported that of the applicants tested 71.8% were eliminated from consideration by the machinist apprentice battery, 38.0% by the machine shop trainee battery, and 16.9% by the machine-tool operator battery. These results are held to be in line with the fact that it is easier to train individuals to become machine operators than it is to train them to become all-round machinists, and also that it is to be expected that more individuals will exhibit a potentiality to become machine operators than to become machinists. These three batteries in the general field of machine shop work are recommended for the following differential application: (a) the machine-tool operator battery to select applicants for referral to a training course in which the instruction is limited to the operation of a single machine, (b) the machine shop trainee battery to select applicants for referral to more general training courses covering the operation of several machines, and (c) the machinist apprentice battery to select applicants for referral to a regular four year apprenticeship. A parallel will be noted between Hardtke's findings and the previously mentioned proposed use of other tests for differential selection by Schultz (85). The batteries used by Hardtke are listed by Stead and Masincup (89) but are not described.

*Intelligence and Machine Shop Work.* One of the earliest attempts to relate intelligence to aptitude for machine shop work is that reported by Bird (13). For a group of 25 unselected vocational students, he found a correlation of .14 between intelligence ranks based on the Stanford Revision of the Binet-Simon scale and ranks based on the students' progress in learning the fundamental operations on the engine lathe. The most extensive work in this field is that done by Pond (69, 70, 71, 72, 73, 74) for the Scovill Manufacturing Company which employed about 5,000 men and women engaged in the fabrication of brass, bronze, nickel-silver and other alloys of copper and nickel, and the manufacture of articles from brass and other metals. In one study (73) eight men who had been with the company for years ranked 44 occupational groups according to the estimated degree of intelligence required to do the work in-



volved. These rankings were highly reliable and correlated .768 with rankings of the groups on the basis of average scores obtained on the Scovill Classification Test, .741 with rankings based on mean schooling, and .002 with rankings based on average age. Pond discusses in detail (69, 70) the validation of the tests used on 3,184 employees categorized in 65 occupational groups covering, among other things, the machine shop, foundry, and metal fabrication departments. Critical scores were established (70) for the various occupational groups which marked off a "preferred range" of scores which would select workers who were likely to stay on the job for at least six months. However, evidence presented in a later study (73) indicated that job tenure for a six month period cannot be used adequately as a criterion for test validation, since the loss of employees for all causes during the first six months of employment was not selective in terms of test scores, schooling, or age. The development of test measures for the selection of toolmaker apprentices (71) indicated that the nonverbal tests used were more significant than the verbal tests. By the use of a preferred range of test scores in which the percentage of satisfactory workers (82%) was significantly higher than in the group as a whole (60%), it was possible in one year to reduce the number of unsatisfactory apprentices hired from 18% to zero. Follow-up data on the use of the developed test battery is reported (72, 74) covering a period of several years. Clear-cut results (72) show that by the adoption of a preferred range of test scores for toolmaking apprentices, the quality of the group selected was improved as much as formerly had been accomplished in one year's trial in the course. Before the tests were used, the 61% of the new hires who were considered satisfactory apprentices was improved to 82% at the date of the first annual rating because of a natural sifting process over the one year period. After the tests were used, the 83% of the new hires who were considered satisfactory apprentices was improved to 97% at the date of the first annual rating. Later work (74) showed that the percentage of new hires who were considered satisfactory apprentices could be increased from 83% to 93% by addition of the MacQuarrie Test of Mechanical Ability and the O'Connor Wiggly Block Test to the Scovill Classification Test and interview formerly used for selection. These three tests, with individual validity coefficients of .315, .369, and .364 respectively as measured against foremen's rankings of 83 apprentices, resulted in the highest multiple R when eleven different test measures were studied. It is interesting to note, however, that individual validities of .411 and .393 were reported for a Homemaker Paper Form Board Test and the Kent-Shakow Industrial Form Board respectively.

#### England

It is of interest to compare Pond's findings (70, 73) with Tagg's opinion (93) of the amount of intelligence, expressed on a five-point scale, required for work in the engineering trades. He concludes that most occupations in the engineering industry require average, or above average, intelligence of the worker. It should be remembered that in England the "engineering trades" include virtually all metalworking occupations. This is made clear by a table presented by Tagg (93) in which he lists a variety of specific occupations included in the following engineering trades: (a) drawing office, (b) pattern shop, (c) cost office, (d) tool room, (e) foundry, (f) machine shop, (g) inspection department, and (h) fitting and erecting. Tagg also reports correlations of .39 and .60 respectively between estimation of lengths and drawing of lengths with turnability on a centre lathe. These tests supposedly measure the static and dynamic forms of space perception which Tagg considers important for satisfaction (93) in work.



factory performance in the tool room and machine shop. Tagg's discussion is continued in a later paper (94) in which he describes three classes, or types, of apprentices found in the engineering industry in England.

Tagg (95) also compared the trade ranking of young men in training for various trades at a technical school with their performance on the Compound Slide Rest Test which was also used by Patten (68), Gleason (31), and Bennett and Fear (8), and is described by Bingham and Freyd (12). The following correlations were obtained between test performance and trade ability: turning .62, fitting .55, patternmaking .39, machine operation .57, and toolmaking .59. Tagg also describes the use of eight other tests for indicating six different trade abilities of 126 trainees. He feels that individual tests are more reliable than group tests when testing for special abilities and states that standard psychological tests give low validities with practical abilities because of the elimination of extraneous conditions which are present on the job.

Allen (1) summarizes a report by Allen and Smith (2) describing the use of a battery of seven tests covering intelligence, mechanical aptitude, mechanical ability, and dexterity for the selection of trainees for various skilled trades in the engineering industry in Birmingham, England. Follow-up data are presented by Allen and Smith (3, 4). It was found (4) that exclusion of a verbal intelligence test from the battery improved its prognostic value for 149 apprentices who were followed up 2½ years after being tested.

Holliday (47, 48, 49) presents additional work done in England on tests for the selection of engineering trade apprentices in such trades as fitting, tinsmithing, and toolmaking. His initial study (47) involved the administration of eight different tests to a total of 127 subjects in three different apprentice categories. A follow-up study (48) resulted in the elimination of three of the tests and the subsequent establishment (49) of critical scores on a verbal intelligence test based upon a five-point classification of the ability of 268 apprentices. Holliday is not impressed with the value of shop grades as a criterion for evaluating tests and feels that "nothing can be a substitute for a thorough careful individual study of each apprentice" (48, page 148).

#### *Germany*

The extensive work of German investigators in the development of tests for the selection of apprentices in the metalworking industries has been reviewed in this country primarily by Viteles (100, 101, 102, 103, 104, 105) who has frequently pointed out that Germany was a leader in this field. In fact, as early as 1921 it was reported that one-half of the large metal works in Germany were using psychological tests in the selection of workers; and manufacturers, schools, and labor unions had combined to require the use of such tests as preliminary to the acceptance of an applicant for an apprenticeship in the metal trades industry (100). Manson (61) also mentions the work of the Germans in this field. Unfortunately most of the German investigators do not report work done on specific metalworking occupations, but write generally of apprentices in the metal industry.

Several writers have presented surveys and summaries of the work done in this field. One report (106) presents brief statements from about 25 firms using tests in the selection of apprentices; Kellner (51) surveys the extent and usefulness of tests over a nine-year period in Berlin industries and concludes that suitably selected apprentices are 15% more efficient than those haphazardly selected. Valentiner (99) reviews the use of tests for the selection of apprentices by large industries in Bremen over a 12 year period and concludes that the test-



ing program was worthwhile. Köhler (52) discusses the testing program of another large metal industry and after a comparison of labor turnover with and without test selection methods concludes that the testing activity has more than paid for itself from a financial viewpoint. Moede (62, 63, 64), Bünnagel (19), and Lysinski (60) discuss problems and developments in the selection of apprentices for the metal trades.

Hildebrandt's (44) evaluation of tests administered to machine shop apprentices has doubtful value because only 13 subjects were used and the criterion data were inadequate. A more careful analysis and follow-up of test validity is presented in two other studies by this investigator (43, 45). An analysis of production records for apprentices over a 5 year period disclosed that the introduction of tests into one plant resulted in an 11.6% decrease in production time and a 14.3% increase in quality. Also, there was a higher proportion of involuntary separations among apprentices with low scores than among those with higher scores. Hildebrandt and Borsig (46) studied the quantity and quality of work turned out by 24 apprentices on diverse operations but claimed that the period of employment was not long enough to produce reliable criterion data. Roloff (80) administered 28 tests to 34 apprentices and conducted a very thorough and careful validation of the tests used. Another thorough study of a large battery of tests is that reported by Bramesfeld and Taubeneck (16), but the results are weakened by the small number of subjects and doubtful criterion data. These investigators found markedly lower reliability and validity figures for the sensory tests used when compared with the tests of intelligence and motor ability.

The development and use of tests for apprentice selection at a large German General Electric Company plant are reported by Lipmann and Stoltzenberg (58), Heilandt (39, 40, 41), and Luithlen (59). Luithlen presents a brief survey of the status of the testing program in that plant and describes the tests used. Validation data for these tests are given by Heilandt (41) who compared the pre-employment test scores with the work records of 131 apprentices who had completed their four-year apprenticeship. The criterion used was a combination of supervisor's ratings, scores on a work examination, and grades received on the final examination given by the apprenticeship school. The development and use of tests in other specific plants are discussed by Rupp (82), Blumenfeld (15), and Friedrich (29). The work of Lipmann and Stoltzenberg (56, 57) on the selection of skilled workers for the metal trades serves as the basis for further investigations by Streller (91, 92).

Viteles (104, page 279) summarizes the work of several of the German workers in the following way:

The testing techniques of the first three investigators (Moede, Lipmann, Heilandt) resemble each other closely. The tests used by Rupp differ somewhat from these while Hildebrandt appears to have made use of material drawn in part from the work of these investigators and in part from other sources. In general, their methods agree in their use of a group of tests measuring underlying abilities presumably involved in mechanical operations of the type performed by apprentices under training as machinists, tool makers, tinsmiths, for foundry work, and in other related occupations in the metal industry. In many instances the tests are analytic in character, although among them are found a number of the analogous type.

#### *Other Countries*

The use of tests for the selection of apprentices in the metal trades has also been reported from other countries. Carrard (21), whose paper deals primarily



with training procedures, mentions that a fair amount of agreement was found between test results and ratings based on training school performance and production records of semi-skilled workers in a machine shop in Switzerland. Schulhof (84) describes the use of a movable laboratory for testing metal trade apprentices in Czechoslovakia. Lahy (53) briefly mentions a study in France comparing the test scores of 53 apprentices with their accomplishments in academic subjects and work shops in an apprentice school. Toltchinsky (98) touches upon the work of the Russians and compares the various methods used in selecting metal trade workers. He also criticizes the assumption that it is possible to use a single series of tests for an industry including over 100 specialized activities, each of which is characterized by highly diverse operations. This assumption appears to underlie all of the European and English studies, as well as many conducted in this country. The opposite approach is taken by the Occupational Analysis Section of the U. S. Employment Service which initially develops all of its aptitude test batteries on specific well-identified occupations (89, 90). Arcan's work (6) in Europe was aimed at obtaining a psychological profile of the metal trade and determining the deviations of subsequent applicants from the trade profile. His analysis of a battery of eight tests disclosed what were termed technical and sensorimotor factors. Bingham and Freyd (12) mention some studies made in Holland by Prak. Presumably, the numerous domestic and foreign investigations concerned with the selection of apprentices have studied the various machine shop and related occupations unless otherwise specified.

#### SHEET METAL OCCUPATIONS

The tinsmith, coppersmith, and sheet metal occupations have been much less frequently studied than those involving various phases of machine-tool operation. Holliday's study (47) of tinsmithing apprentices in England has already been discussed. Drury (27) briefly discusses the use of the Otis Self-Administering Intelligence Test and the Minnesota Paper Form Board to select applicants for employment in five different "mechanical apprentice" jobs. Only subjective impressions are presented and no validation data are given. One individual case is briefly discussed in which the tests were used as the basis for the transfer of a worker to the "sheet metal craft" from a "non-mechanical department." Irwin (50) discusses the administration of intelligence, temperament, and aptitude tests to over 30,000 applicants at the Lockheed Aircraft Corporation for all classes of occupations, among which is undoubtedly aircraft sheet metal work. The Minnesota Manual Dexterity Tests and the O'Connor Wiggly Block Test are used to measure aptitudes, especially for the various learner classifications. No validation data are presented and virtually nothing is said about the effectiveness of these tests. A slightly edited reprint of Irwin's paper is presented under Prudden's name (75). Collins (22) also discusses the Lockheed testing program in a general nontechnical manner.

Cox (23) describes the standardization of his own tests on 228 students in a large Royal Air Force Technical School in England. These students were taking training to qualify as mechanics in a variety of trades, including copper-smith, fitter, pattern maker, electrician, carpenter, instrument maker, and others. Unfortunately, no distinction was made between these various trades since Cox was only interested in investigating the existence of a general mechanical aptitude which would be measured by his tests. Stanbridge (88) also presents results obtained on aircraft apprentices of the Royal Air Force. Al-



though 1,100 apprentices who were tested were being trained for various trades and duties, no distinctions were made between the various trades. Schmidt (83) describes the use of four tests measuring manual dexterity for the selection of unemployed persons in Germany to receive training in metalworking for the aircraft industry.

Harrell and Faubion (35, 36) developed tests to aid in the selection of aviation mechanics in the U. S. Army Air Forces. The tests used initially (35) resulted in 38 subtest and four total test scores. These scores were correlated with instructors' grades in five types of course material presented during eight weeks of basic training. Grades obtained in Shop Mathematics, Mechanical Drafting and Blueprint Reading, and Elements of Metalwork were combined to give a composite basic instruction grade with which 13 test scores correlated as high as .40. The following four tests gave a multiple R of .72 with the composite basic grade: Thurstone's Surface Development, Mechanical Movements, and Identical Forms Tests, and the Army Alpha Addition Test. A later study (36) by these same investigators employed the Army Alpha and Thurstone's Primary Mental Abilities Tests. The grades received in Elements of Metalwork did not correlate significantly with any of these tests. It was concluded that there was no separate factor for a mechanical ability, but there were several factors more or less prominent in mechanical work whose pattern depended on the type and complexity of the work and on the point reached on the learning curve. A verbal factor was found present in training given for more complex mechanical work, along with a space factor, knowledge of mechanical processes, and two reasoning factors. A manual agility factor was found in routine jobs where individual differences depended upon the manipulation of objects such as nuts and bolts.

Paterson and others (67) used, along with other courses, a sheet metal shop course in a junior high school to standardize the various Minnesota Mechanical Ability Tests. In a preliminary experiment conducted on 80 sheet metal trainees, the highest validity coefficient reported (67, page 75) was .35 obtained with a Paper Form Board Test. This same test gave validities of the same order upon further analysis on samples of 58 and 79 subjects (67, pages 430-431). These investigators were able to develop a battery with a validity coefficient of .47 for sheet metal shop work (67, page 215).

#### FOUNDRY OCCUPATIONS

Studies of actual foundry workers have almost entirely been done by foreign workers. Rachemann (76) used tests of coordination, regularity, and precision in striking with a hammer and judgment of distances in the selection of workers for Russian copper foundries. A study of the relationship between test performance and job performance of 36 apprentices showed a "71% agreement." Bültmann (17, 18) describes the validation of 12 analytic tests for use in the selection of workers and apprentices for foundry work in Germany. Dellwig (25) briefly discusses 10 years of experience with tests in German iron works. The turnover rate among 4,074 foundry workers was 11.7% in 1925. Following the introduction of tests in 1926 to aid in the selection of such workers, the turnover rate dropped to 6.9% in 1927, 6.0% in 1928, 3.2% in 1929, and 2.9% in 1930. In standardizing the Healy Puzzle Box, Hatt and Brandenburg (37) used 29 senior engineers who each had six semesters of shop work including foundry, forging, bench and machine-tool metal work, pattern-making, and woodworking. Box opening correlated .49 with the average of the six grades, and box closing correlated .17.



## MISCELLANEOUS OCCUPATIONS

In investigating differential occupational ability patterns, Dvorak (28) reports the test results obtained on two groups of ornamental iron workers from different companies. The two groups differed significantly in the scores made on the O'Connor Tweezer Dexterity Test. In comparing the ornamental iron workers with machine operators working on lathes, drill presses, and boring mills, it was found that the former were superior to the latter in their manipulative abilities as measured by O'Connor's Finger and Tweezer Dexterity Tests and the Minnesota Mechanical Assembly and Spatial Relations Tests. The differences were statistically significant for nearly every test. Dvorak concluded that the test scores reflect the more skillful job performance required of ornamental iron workers as compared with that required of machine operators. When compared with office clerks, it was found that the iron workers performed much better on the tests of manipulative abilities than on those of abstract functions.

Oakley (65) describes a battery of tests being used in an engineering works in Scotland for the selection of arc welders. The tests reportedly closely reproduce actual working conditions and measure steadiness of movement and speed and accuracy of aim. Radler (77) describes a series of tests administered to workers entering a training course for acetylene welders in Germany. Despite difficulties encountered in obtaining criterion data, validity coefficients were obtained which ranged from  $-0.40$  to  $+0.40$ . The better tests seemed to be those measuring steadiness, calmness, perseverance, and slowness.

Apparently the only study of blacksmiths is that reported by Heugel (42) who investigated their qualifications and various tests measuring these qualities. The tests used consisted of specific ability and trade tests which were inadequately evaluated on ten subjects.

Fryklund's study (30) has not been mentioned earlier because it covers the entire field of occupations under consideration, including many of those which have not been otherwise investigated. Fryklund classifies all factory workers into five general classes on the basis of the skill and judgment required of them and the training time of the job. Test scores obtained by 480 workers on nine different tests are analyzed for their ability to differentiate between the various classes on the different tests. The detailed results are too comprehensive to be presented in this paper.

Most of the recent work in the field under consideration has been carried out by the Occupational Analysis Section of the United States Employment Service. A list of the various aptitude test batteries developed to aid in the selection of applicants for various specific metalworking occupations is presented by Stead and Masincup (89).

## CONCLUSION

After reviewing what has been done in the field of aptitude testing for metalworking occupations the paucity of adequate studies becomes apparent. One is struck with the meagerness of the samples, the unreliability of both the tests used and the criterion data employed as a standard for determining the validity of the tests. Very few authors define the jobs studied and many unverified subjective conclusions are drawn concerning the efficacy of the tests. It appears that many of the studies were the result of attempts to "sell" an industrial concern or other organization on the value of tests in a personnel selection program.



It is the opinion of this reviewer that more attention needs to be given to the fundamentals of good technique and method in this particular field. More careful consideration must be given to the

1. size of the sample available for study,
2. objective analysis and definition of the specific circumscribed job to be investigated,
3. selection or construction (on the basis of an adequate job analysis) of individual tests which have a reliability of such an order that an adequate validity may be anticipated,
4. selection of highly reliable criterion data to be used for the validation of the tests, and
5. proper weighting of the individual tests comprising an aptitude test battery.

Admittedly the problems encountered at each step are manifold from a practical standpoint. Nevertheless, a more faithful adherence to high technical standards should result in more acceptable and profitable studies in an important and fertile field for industrial psychology.

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PROCEEDINGS OF THE FIFTY-THIRD ANNUAL MEETING  
OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.,  
EVANSTON, ILLINOIS  
September 6, 7, 8, 1945

REPORT OF THE RETIRING SECRETARY, WILLARD C. OLSON  
UNIVERSITY OF MICHIGAN

The meeting of the Council of Directors was called to order by *President* Edwin R. Guthrie at 9 o'clock a.m. Thursday, September 6, in the Hardy Lounge of Scott Hall on the campus of Northwestern University in Evanston. *Council members* present were Donald G. Marquis, Sidney L. Pressey, Carl R. Rogers, Robert H. Seashore, Dael L. Wolfe, *Secretary* Willard C. Olson, and *Treasurer* Willard L. Valentine. C. M. Louttit was absent because of obligations to the Navy. The new Board of Directors had been invited to sit in joint session until the transition to the reorganization under By-Laws adopted at the September, 1944 meeting of the Association. All elected members of the Board were present: John F. Dashiell, Richard M. Elliott, Henry E. Garrett *the incoming President*, William A. Hunt, Carl R. Rogers *the President-Elect*, Robert R. Sears, C. L. Shartle, and E. C. Tolman.

Gardner Murphy, Chairman of the Election Committee, had reported to the Secretary that the membership had approved the following emergency resolution by a vote of 1204 to 116:

WHEREAS, the Office of Defense Transportation has restricted meetings to groups of fifty or less and WHEREAS, the victory in Europe does not promise any immediate relaxation of travel restrictions and WHEREAS, certain official actions by the American Psychological Association will be necessary under the By-Laws for the transitional year and WHEREAS, the Association has granted the Council of Directors power under conditions described in Article III, Section 4 of the By-Laws, BE IT RESOLVED: That the Council of Directors declare the existence of an emergency and proceed to act for the Association in all matters which may properly come before it.

All actions of the retiring Council thus became final actions by delegated authority.

The Proceedings of the Fifty-second Annual Meeting held at the Hotel Statler in Cleveland, Ohio, on September 12, 1944 were approved as printed in the December, 1944 issue of the *Psychological Bulletin*.

The Secretary distributed a summary of the report on the election of officers and representatives as received from Gardner Murphy, Chairman of the Election Committee:

*President for 1945-46:* Henry E. Garrett, Columbia University

*President-Elect for 1945-46:* Carl R. Rogers, University of Chicago

*Nominees for Representatives to the Division of Anthropology and Psychology of the National Research Council:* Rensis Likert, Bureau of Agricultural Economics, Washington, D. C., Donald G. Marquis, University of Michigan, and Carl R. Rogers, University of Chicago

*Representative on the Social Science Research Council:* Willard C. Olson, University of Michigan

*Regional Representatives:*

I. *New England:* Gordon W. Allport..... 1945-46

II. *Middle Atlantic:* Henry E. Garrett..... 1945-47



III. <i>East North Central</i> : Robert H. Seashore.....	1945-48
IV. <i>West North Central</i> : Richard M. Elliott.....	1945-46
V. <i>Southeastern</i> : John F. Dashiell.....	1945-47
VI. <i>Southwestern</i> : Paul C. Young.....	1945-48
VII. <i>Rocky Mountain</i> : Karl F. Muenzinger.....	1945-46
VIII. <i>Pacific</i> : Edward C. Tolman.....	1945-47
IX. <i>Dominion of Canada</i> : George Humphrey.....	1945-48

*Divisional Officers and Representatives:*

1. *Division of General Psychology*  
*Chairman:* John F. Dashiell  
*Secretary:* Dael Wolfe  
*Div. Rep.:* C. W. Bray  
Wayne Dennis  
K. F. Muenzinger  
Robert Seashore
2. *Division on the Teaching of Psychology*  
*Chairman:* John F. Dashiell  
*Secretary:* Edna Heidbreder  
*Div. Rep.:* Luella Cole  
John F. Dashiell  
Goodwin Watson
3. *Division of Theoretical-Experimental Psychology*  
*Chairman:* Edward C. Tolman  
*Secretary:* Kenneth W. Spence  
*Div. Rep.:* Clarence H. Graham  
Clark L. Hull  
Kenneth W. Spence
5. *Division on Evaluation and Measurement*  
*Chairman:* L. L. Thurstone  
*Secretary:* Florence Goodenough  
*Div. Rep.:* Henry E. Garrett  
Harold Gulliksen  
M. W. Richardson
6. *Division of Physiological and Comparative Psychology*  
*Chairman:* Donald G. Marquis  
*Secretary:* R. B. Loucks  
*Div. Rep.:* Frank A. Beach  
Donald B. Lindsley
7. *Division on Childhood and Adolescence*  
*Chairman:* John E. Anderson  
*Secretary:* Florence Goodenough  
*Div. Rep.:* Arthur T. Jersild  
J. J. B. Morgan\*  
Robert R. Sears
8. *Division of Personality and Social Psychology*  
*Chairman:* Gordon W. Allport  
*Secretary:* Steuart H. Britt  
*Div. Rep.:* David M. Levy  
Theodore Newcomb  
Robert R. Sears  
Ruth Tolman
9. *The Society for the Psychological Study of Social Issues*  
*Div. Rep.:* Gordon W. Allport  
Theodore Newcomb  
Goodwin Watson
10. *Division on Esthetics*  
*Chairman:* Paul R. Farnsworth  
*Secretary:* Norman C. Meier  
*Div. Rep.:* Paul R. Farnsworth  
Herbert S. Langfeld
11. *Division of Abnormal Psychology and Psychotherapy*  
*Chairman:* Carl R. Rogers  
*Secretary:* David Rapaport  
*Div. Rep.:* Norman A. Cameron  
Samuel J. Beck  
Laurance F. Shaffer  
David Shakow  
David Wechsler
12. *Division of Clinical Psychology*  
*Chairman:* Edgar A. Doll  
*Div. Rep.:* Edgar A. Doll  
Gertrude Hildreth  
Carl R. Rogers
13. *Division of Consulting Psychology*  
*Secretary:* Alice I. Bryan  
*Div. Rep.:* Robert A. Brotemarkle  
Emily Burr  
*Rep. to Council of Consulting Psychology:* Herbert W. Rogers

\* Deceased.



14. *Division of Industrial and Business*

*Psychology*

*Chairman:* Bruce V. Moore

*Secretary:* Floyd L. Ruch

*Div. Rep.:* Paul S. Achilles

J. G. Jenkins  
M. W. Richardson } tied

17. *Division of Personnel and Guidance*

*Psychologists*

*Chairman:* Edmund G. Williamson

*Secretary:* J. G. Darley

*Div. Rep.:* J. G. Darley

Alvin C. Eurich  
Harold A. Edgerton  
C. L. Shartle

15. *Division of Educational Psychology*

*Chairman:* Harold E. Jones

*Secretary:* Gertrude Hildreth

*Div. Rep.:* Arthur T. Jersild

Vernon Jones

Helen L. Koch

18. *Division of Psychologists in Public Service*

*Chairman:* M. W. Richardson

*Secretary:* Beatrice Dvorak

*Div. Rep.:* Albert A. Campbell

Dwight Chapman

16. *Division of School Psychologists*

*Chairman:* Morris Krugman

*Secretary:* Ethel L. Cornell

*Div. Rep.:* Fred Brown

Norma E. Cutts

19. *Division of Military Psychology*

*Div. Rep.:* Roger M. Bellows, *Army*

*Div. Rep.:* William A. Hunt, *Navy*

The following officers hold over from the previous organizations so no election was held for the places:

9. *The Society for the Psychological Study of Social Issues:* *Chairman:* Ernest R. Hilgard; *Vice-Chairman:* Theodore Newcomb; *Secretary-Treasurer:* Daniel Katz.

12. *Division of Clinical Psychology:* *Secretary:* Frank P. Bakes (1945-47), *Executive Council:* David Shakow (1944-46), Florence M. Teagarden (1945-47)

13. *Division of Consulting Psychology:* *Chairman:* Rose G. Anderson (1945-46); *Executive Council:* Orlo L. Crissey (1945-47)

15. *Division of Industrial and Business Psychology:* *Executive Council:* Paul S. Achilles (1944-46)

19. *Division of Military Psychology:* *Chairman:* C. M. Louttit (1945-46); *Secretary:* William A. Hunt (1945-47); *Executive Council:* Jack W. Dunlap (1945-46); John G. Jenkins (1945-47)

There are some open questions concerning the exact term of former and new officers in the divisions continuing societies which will need to be answered within the respective divisions.

Information concerning the death of the following fourteen Members and seven Associates had been received since the last Annual Meeting:

*Life Member:* Howard D. Marsh, August 26, 1945.

*Members:* George T. Avery, Dec. 26, 1944; Karl M. Cowdery, Sept. 12, 1944; Edmund B. Delabarre, Mar. 30, 1945; Lucy H. Ernst, Sept. 13, 1944; John Madison Fletcher, Dec. 12, 1944; S. C. Garrison, Jan. 8, 1945; Lydiard H. Horton, Jan. 19, 1945; John J. B. Morgan, Aug. 16, 1945; Fleming A. C. Perrin, Dec. 1, 1944; J. Edward Rauth, Mar. 5, 1945; Winifred V. Richmond, July 5, 1945, William T. Root, Jan. 24, 1945; Raymond R. Willoughby, Oct. 3, 1944.

*Associates:* John W. Dallenbach, June 11, 1944; E. Ruth Kellogg, Feb. 17, 1944; Eugene Lerner, Sept. 21, 1944; Maurice J. Neuberg, Feb. 10, 1945; J. Wallace Nygard, April 13, 1945; Therman K. Sisk, Sept. 25, 1944; Caroline B. Zachry, Feb. 22, 1945.



The following 9 Members and 107 Associates have resigned by their own request or by the automatic provision of the Constitution since the last Annual Meeting:

## MEMBERS

Dorcus, Mildred Day  
Givler, Robert C.  
Hoagland, Hudson  
Loucks, Roger B.  
McCall, William A.  
McGraw, Myrtle B.  
Marvin, Walter T.  
Radosavljevich, Paul R.  
Woodrow, Katherine

Gilbert, Michael M.  
Good, D. R.  
Gray, W. H.  
Greenwald, D. Ulrich  
Haire, Mason  
Hall, Robert C.  
Hall, Ruth Moncrieff  
Halprin-Kirsch, Janet  
Hamilton, James A.  
Hamstra, Elizabeth K.  
Hansen, Edith Sprague  
Harley, H. L. R.

Hawkins, Hermione H.  
Hayes, George L.  
Heering, Gertrude  
Herzman, Ruth  
Hinton, Ralph Thompson  
Holaday, Beverley E.  
Jacob, Joe S.

Johnson, Winifred B.  
Jones, Louise Fenger  
Keachie, Edward C.  
Keith, Walter P.  
Kemp, Edward H.  
Kennedy, Leo Raymond  
Kenerson, Anita Reubens  
Knapp, Robert Hampden  
Knight, James  
Kohn, Harold A.  
Kounin, Jacob S.  
Krasno, Louis Richard  
Laushall, Pearl Bartholo-

new

Layman, John D.  
Lazar, May  
Lewis, Sybille Berwanger  
Lind, Christine  
Lowe, Charlotte  
McDaniel, J. W.  
McMullen, Charles B.

Mahl, George F.  
Mandel, Grace Hirschberg  
Mann, Mary B.  
Mayo, Elton  
Mielke, Hazel Johnson  
Miller, Mungo  
Milner, Clyde A.  
Monaghan, E. A.  
Mulmed, May Monya  
Nagge, William Walker  
Nyswander, Dorothy B.

Page, Marjorie L.  
Palmer, Gladys E.  
Payne, Bryan  
Perry, Warren B.  
Phelan, Joseph G.  
Phillips, Franklin M.  
Price, Dennis H.  
Raimy, Victor  
Raimy, Mrs. Victor  
Rhinehart, Jessie B.  
Rose, Dorian M.  
Rogosin, H.  
Runner, Kenyon R.  
Schapiro, Jack M.  
Schleman, Helen B.  
Shaad, Dorothy  
Shurrager, Harriett Cantrall  
Silverman, William J.  
Smart, Mollie Stevens  
Snee, Thomas J.  
Steer, M. D.  
Stevens, Samuel N.  
Stratton, Dorothy C.  
Thompson, Jane  
Weaver, Helen Guffey  
Welch, S. W. J.  
Wenrick, John E.  
Willard, Louisa S.  
Worchel, Philip

## ASSOCIATES

Ammen, Cleo Chrisof  
Banker, Mary Helen  
Bartlett, Lynn M.  
Behanan, Kovoov Thomas  
Bell, Reginald  
Benjamin, Harold  
Bernstone, Arthur H.  
Beyers, Otto John  
Bird, Joseph W.  
Braley, Kenneth  
Brase, Herman H.  
Brookhart, Elinor E.  
Bryan, Carol E.  
Carr, Edward J.  
Chidester, Leona  
Christian, Alice M.  
Coronios, James D.  
Costello, Maurice H.  
Davis, Corinne  
Davis, Helen C.  
Deutscher, Max  
Dickenson, Jean Neasmith  
Donnelly, John Henry  
Eselun, Mary P. B.  
Farberow, Norma L.  
Fernsler, Alice Elizabeth  
Forster, Miriam  
Gellings, Elizabeth Clark

The following Associates by reason of inaccessibility or for other reasons did not validate their election at the 1944 meeting by the subsequent payment of dues: Betty L. Broadhurst, Gordon Eckstrand, Saul Hofstein, Norma L. Metzner, John W. Thibaut, Ethelbert Thomas, Jr., and Walter A. Woods. Gordon Eckstrand and Ethelbert Thomas, Jr. asked to have their election deferred until the 1945 meeting.



The following Members have applied for and received the status of Life Members: Stanley Abbot, Charles Scott Berry, Samuel P. Hayes, Grace Kent, D. P. MacMillan, and Lightner Witmer.

The following twenty-two Associates of the AAAP, not previously affiliated with the APA, were transferred to Associateship under the By-Laws for the transitional year as of January 1, 1945.

Brown, Rosina M.	Kennedy, Lou	Pierce, Watson O'dell
Coleman, John H.	King, Alma R.	Riggs, Lawrence
Collins, Nancy T.	Kittredge, Winifred	Royon, Andree V.
Cooper, Emily M.	Marshall, Margaret	Saul, Herbert
Crowley, Agnes	Mathewson, Robert H.	Spache, George
Eagen, Edward J.	Murray, Elwood	Wood, Ray G.
Howland, Hazel P.	Myklebust, Helmer R.	Zehrer, Frederick A.
Ikeler, Helen K.		

Since Edward J. Eagen transferred late he was not included in the 1945 Yearbook.

The following 123 Associates of the APA, Fellows of the AAAP, were transferred to Member as of January 1, 1945 under the By-Laws for the transitional year.

Allen, Doris Twitchell	Dysinger, Don W.	Marzolf, Stanley S.
Anderson, L. Dewey	Eyre, Mary B.	McBride, Katherine E.
Andrus, Ruth	Erdelyi, Michael	McCauley, Selinda
Armstrong, Clairette P.	Evans, Blanche R.	Menger, Clara
Bakes, Frank P.	Fagan, Leo B.	Mercer, Margaret
Barker, Margaret B.	Fitts, Paul M., Jr.	Miles, Dwight W.
Baruch, Dorothy W.	Fitz-Simons, Marion J.	Miller, Lawrence W.
Bear, Robert M.	Frank, Margaret	Morris, Elizabeth H.
Behrens, Herman	Frith, Gladys D.	Mullen, Frances A.
Bently, John E.	Giardini, Giovanni I.	Munson, Grace E.
Bradway, Katherine	Gilbert, Jeanne G.	Nash, Bert A.
Bransford, Thomas	Groff, Marne L.	Ohmann, Oliver
Brooke, Margaret C.	Grove, William R.	O'Connor, Zena C.
Brown, Ralph R.	Hall, Clifton W.	O'Shea, Harriet E.
Brownell, W. A.	Hall, Margaret E.	Oswalt, Edna R.
Brozek, Joseph M.	Hanna, Joseph V.	Page, Richard M.
Cabot, P. S. de Q.	Hawk, Sara Stinchfield	Pendleton, C. R.
Calhoon, C. H.	Hazelhurst, Jack H.	Pignatelli, Myrtle
Carrington, Evelyn M.	Hildreth, H. M.	Pond, Millicent
Carter, Jerry W., Jr.	Hoppock, Robert	Prescott, Daniel
Cleeton, Glen U.	Horton, Lydiard H.	Reiman, M. Gertrude
Conkey, Ruth C.	Houtchens, H. Max	Rivlin, Harry
Cornell, Ethel L.	Jackson, James D.	Robertson, Marjorie E.
Crissey, Orlo L.	Jacobsen, Marion M.	Rock, Robert T.
Cutts, Norma E.	Kawin, Ethel	Rosebrook, Wilda M.
de Fremery, Herman	Kelly, George A.	Roslov, Sidney
de Weerd, Esther	Ketterlinus, Eugenia	Rundquist, E. A.
Dreese, Mitchell	Lee, Mary A.	Scheidt, Vernon P.
Durost, Walter Nelson	Limburg, Charles C.	Schott, E. L.
Dvorak, Beatrice J.	Lincoln, Edward A.	Schwesinger, Gladys C.
Dysinger, Wendell S.	Mahan, Harry C.	Shea, John P.



Simmons, Persis W.	Street, Roy F.	Waller, M. L.
Skinner, H. Clay	Strother, Charles R.	Watt, R. R. G.
Smeltzer, C. H.	Tallman, Gladys	Whiteside, Stella
Smith, Kinsley R.	Teegarden, Lorene	Whitmer, Carrol A.
Spirer, Jess	Thompson, William H.	Wieman, Regina W.
Springer, Norton	Tomlinson, Brian E.	Wilke, Walter H.
Starr, Anna S.	Trow, William Clark	Witmer, Louise
Stevens, Hazel H.	Tulchin, Simon	Witty, Paul A.
Stogdill, Emily L.	Vaughn, Charles	Woodring, Paul Dean
Stogdill, Ralph	Wallace, Isabel K.	Young, Robert A.

In the above list, the following transferred too late to be starred as Members in the 1945 Yearbook: Leo B. Fagan, Margaret E. Hall, Kinsley R. Smith, M. L. Wallar, and Louise Witmer.

The following fifteen Fellows of the AAAP, non-affiliated with the APA, were transferred to Member as of January 1, 1945:

Betts, Gilbert	Hovde, Howard	Strang, Ruth M.
Burch, Mary C.	Laird, Donald A.	Thompson, Lorin A.
Eaton, Merrill Thomas	Lloyd-Jones, Esther	Weill, Blanche C.
Edwards, A. S.	Scarf, Robert C.	Wood, Louise
Ford, Charles	Schramm, Gregory J.	Woodyard, Ella

The following appointments were made by President Edwin R. Guthrie during the past year:

Dr. Bertha M. Luckey of Cleveland, Ohio as delegate at the inauguration of Howard Foster Lowry as seventh President of the College of Wooster, on Saturday, October 21, 1944.

Dr. Robert A. Brotemarkle and Dr. Francis W. Irwin of the University of Pennsylvania as delegates to the Forty-ninth Annual Meeting of the American Academy of Political and Social Science on April 13, and 14, 1945 at Philadelphia, Pennsylvania.

The Secretary attended meetings of the Emergency Committee in Psychology of the National Research Council on December 7 and 8, 1944 in New York City as the Representative of the APA. Plans for the discontinuation of the Committee and the Office of Psychological Personnel were discussed and are described in Leonard Carmichael's report for the National Research Council.

On January 29, 1945, the Council of Directors voted an appropriation to cover the expenses of a meeting of the Committee on the Official Journal.

On June 4, 1945, the Council of Directors voted to appropriate an additional \$200.00 for the work of the Election Committee. The appropriation of \$200.00 proved to be inadequate. The added appropriation failed to cover the total bill of \$896.62.

On March 21, 1945, the Council of Directors voted a supplementary appropriation of \$927.00 for the services of the Secretary for eight weeks in July and August to enable him to request a leave from University teaching to devote himself to the affairs of the Association.

In a number of cases the membership of Committees was not stated in the actions taken at the 1944 meeting of the Association. Appointments were left to President Guthrie in consultation with President Rogers of the AAAP. Committee members subsequently appointed follow: *The Divisional Organization Committee*: E. R. Hilgard, *Chairman*, Alvin C. Eurich, Horace B. English,



David Shakow, Robert M. Yerkes; *Committee on Utilization in Psychology of Surplus War Materials*: Arthur W. Melton, *Chairman*, Charles W. Bray, Paul M. Fitts, Carroll L. Shartle, Donald Marquis; *Committee on Official Journal*: John E. Anderson, *Chairman*, Alice I. Bryan, Stuart H. Britt, P. T. Lazarsfeld, Donald Marquis; *Committee on International Planning for Psychology*: Herbert S. Langfeld, *Chairman*, Walter S. Hunter, Walter R. Miles, Robert M. Yerkes; *Committee on Standards for Psychological Service Centers*: David Shakow, *Chairman*, Jerry W. Carter, Norman Fenton, Donald G. Lindsley, C. M. Louttit, Marie Skodak, Robert M. Yerkes.

On November 2, 1944, the Council of Directors voted to create a *Committee on Clinical Psychology* with the general purpose of clarifying the relationship between Psychiatry and Clinical Psychology and studying related problems. The following Committee was appointed by joint action of President Guthrie and of President Rogers: L. F. Shaffer, *Chairman*, William A. Hunt, Donald G. Marquis, Marie Skodak, Frederick C. Thorne, Edwin E. Guthrie (ex-officio), Carl R. Rogers (ex-officio).

In the Spring of 1945, the Council of Directors created a *Subcommittee on Location of Central Office* with the following members: R. H. Seashore, *Chairman*, Rose G. Anderson, Marion A. Bills, Donald G. Marquis; and a *Subcommittee on Appointive Officers* with the following members: Dael Wolfe, *Chairman*, Robert A. Brotemarkle, Alice I. Bryan, C. M. Louttit, Donald G. Marquis, Willard C. Olson. Appointments were made jointly by President Guthrie of APA and President Rogers of AAAP.

As instructed at the Annual Meeting of 1944, the Secretary sent an invitation to the Psychometric Society and to the Society for the Psychological Study of Social Issues to become charter divisions of the APA under the new By-Laws. The invitation was issued on November 4, 1944. The SPSSI accepted the invitation and has participated in the election machinery. The Psychometric Society decided not to accept the invitation at this time.

A declaration of emergency was adopted unanimously by the retiring Council of Directors on May 17, 1945, and was referred subsequently for an advisory poll to Associates and Members.

The Secretary further announced that the Board of Governors, the Board of Directors, and the Board of Affiliates of the AAAP were holding terminal meetings in Evanston on September 6, 7, and 8, 1945.

The Council of Directors voted to incorporate the announcements of the Secretary in the Proceedings of the Fifty-third Annual Meeting.

Council voted an appropriation of \$496.62 to cover the deficit in the expenses of the Election Committee.

The Council voted to elect John Dollard, Jon Eisenson, and Roger B. Loucks, directly as Members.

The Council voted to transfer the 40 Associates named below to the status of Member:

Berdie, Ralph F.  
Bijou, Sidney W.  
Bondy, Curt  
Bonney, Merl Edwin  
Brown, Robert H.  
Campbell, Ronald K.  
Chen, Isador  
Crespi, Leo Paul

Daniel, William John  
Davis, Frederick B.  
de Weerd, Ole N.  
Dietze, Alfred G.  
Eysenck, Hans Jurgen  
Gardner, John W.  
Goldfarb, William  
Grant, David A.

Harris, Daniel H.  
Harsh, Charles M.  
Hibler, Francis W.  
Hopkins, Pryns  
Ives, Margaret  
Jensen, Kai  
Joel, Walther  
Johnson, Donald M.



Josey, Charles G.  
Kappauf, William E.  
Kuder, G. Frederic  
Luchin, Abraham S.  
Lough, Orpha M.  
MacKinnon, Donald W.

O'Kelly, Lawrence  
Schmidt, Hermann O.  
Schubert, Herman J. P.  
Shaffer, George W.  
Sobel, Francis  
Stalnaker, John M.

Tuckman, Jacob  
van Ormer, Edward B.  
Wallen, Richard W.  
Wilson, William R.

The Council voted to elect the following 387 persons to Associateship:

Abt, Florence  
Aiksnoras, Peter J.  
Ales, Victor W.  
Albright, Louis C., Jr.  
Allerton, Alpheus B.  
Amacher, Phyllis L.  
Anastasio, Mary M.  
Anderson, Pauline K.  
Arkola, Audrey L.  
Armon, Mary V.  
Arnold, Frank C.  
Avakian, Sonia A.  
Badenhausen, Bayard  
Banks, Teresa L.  
Bannon, Kathleen  
Barber, Joseph E.  
Barry, John R.  
Battaglia, Blanche M.  
Beck, Lloyd H.  
Bell, Richard Q.  
Beller, Emanuel K.  
Bernal del Riesgo, Alforiso  
Bexton, William H.  
Bietz, Arthur L.  
Bigelow, Gertrude M.  
Bindra, Dalbir  
Birnberg, Vita K.  
Bluett, Charles G.  
Blum, Robert A.  
Bomberg, Dorothy  
Botzum, William A.  
Bouthilet, Lorraine  
Bowen, Mary H.  
Brantly, Mary L.  
Brenner, Louise F.  
Brody, Marian H.  
Brody, Mildred  
Brooks, Leah E.  
Brophy, Catherine E.  
Brosin, Henry W.  
Brower, Judith F.  
Brown, Enid

Brown, Moroni H.  
Brown, Ruth Franklin  
Bruce, Earle W.  
Burgess, Elva  
Burnett, Olivia F.  
Caggiano, Elvira R.  
Call, Catherine M.  
Callicutt, Laurie  
Campbell, Astrea S.  
Campbell, Donald T.  
Campbell, Nellie M.  
Campos, Nilton  
Candon, Vera A.  
Canter, Aaron H.  
Carey, Justin P.  
Cawley Sister Anne  
Centers, Richard T.  
Cerf, Arthur Z.  
Chalfen, Leo  
Chaput, Rvd Gerard  
Chisholm, Roderick M.  
Clark, Jerry H.  
Clark, Walter H.  
Clark, Willis W.  
Clarke, Helen J.  
Clauss, Helen O.  
Clow, Ruth Maurine  
Cochran, June B.  
Cohen, Bertram D.  
Cole, Joseph C.  
Colvin, Ralph W.  
Connelly, Eleanor S.  
Cooke, Francis M.  
Cooper, Dorothy M.  
Cooper, Ruth I.  
Coppock, Harold W.  
Crawford, Isabel  
Crossen, Margaret L.  
Dahlstrom, William Grant  
Daniels, Edgar E.  
Deigh, Maurice  
Diamond, Solomon

Dinsmoor, James A.  
Dominguez, Kathryn E.  
Donahue, Wilma T.  
Donceel, Joseph F.  
Dorfman, Elaine  
Douglas, Anna G.  
Douglass, Frances  
Dow, Andrew N. Jr.  
Duncan, Carl P.  
Dylla, Elaine R.  
Eckhauser, Irwin A.  
Eckstrand, Gordon A.  
Edwards, Harry E.  
Eisenberg, Arthur  
Eiserer, Paul E.  
Eldersveld, Wilma L.  
Elinson, Jack  
Ellis, Katherine  
Ericson, Martha C.  
Escalona, Sibylle K.  
Everett, Evalyn, G.  
Eves, Benjamin M.  
Farabaugh, Mary E.  
Fattu, Nicholas A.  
Fauquier, William A.  
Fehlman, Charlotte  
Feldman, Marvin J.  
Feldman, Natalie S.  
Feldman, Robert S.  
Ferdinand, Rita A.  
Fife, Isabelle E.  
Fleming, Louise  
Filer, Robert J.  
Fishman, Seymour  
Fite, Mary D.  
Frank, Jeanette  
Frankl, Anni W.  
Freestone, Norman W.  
Frazeur, Helen A.  
Freyman, Grace M.  
Fulcher, John S.  
Gallico, Margaret W.



- Gano, Peggylee P.  
Garrett, Wiley S.  
Garrity, Agnes K.  
Gee, Helen H.  
Gilbert, Albin R.  
Gilman, Thelma F.  
Gilmore, John V.  
Gleason, John G.  
Goitein, Percy S.  
Gold, David  
Gold, Leonore  
Goldberg, Ilse  
Goodenough, Eva E.  
Gordon, Norman B.  
Gough, Harrison G.  
Grauel, Claire K.  
Grier, Norman M.  
Grobe, Mary A.  
Grosslight, Joseph H.  
Groves, Marion H.  
Hahn, Albert R.  
Hammer, Elaine R.  
Hand, Thomas J.  
Hansen, Abner L.  
Harrington, Jay A.  
Harris, Anna R.  
Hattell, Kathryn L.  
Haygood, James D.  
Hecht, Irving  
Heintz, Roy K.  
Henderson, Cuyler M.  
Hendrickson, Carol R.  
Henry, Edith R.  
Hobden, Frank E.  
Hoffmann, Shirley R.  
Holden, Miriam  
Hooper, William H.  
Houlihan, Rita Anne M.  
Hulett, James E., Jr.  
Hyde, Alice E.  
Irwin, Ruth B.  
Isaacs, Ann F.  
Jackson, Joseph S.  
Jackson, Patricia L.  
Jahoda, Marie  
Jeffery, Mary E.  
Jeffre, Maria Friederike  
Jewett, Gladys M.  
Johnson, Anna P.  
Johnston, Ruth V.  
Jones, Gordon A.  
Jones, Robert E.  
Kaback, Goldie R.  
Kaffer, Fred C.  
Kalhorn, Joan  
Karcher, E. Kenneth, Jr.  
Kass, Walter  
Katz, Elias  
Kelley, Harold H.  
Kells, Doris M.  
King, Alice G.  
Kirk, Victor A.  
Koester, Theodore  
Kohn, Nathan, Jr.  
Kvaraceus, William C.  
Larsen, Vernon F.  
Laschinger, Elizabeth J.  
Lawrence, Merle  
Lazarus, Richard S.  
Leggett, Alan L.  
Lesk, Helena M.  
Lepkin, Milton  
Levinson, Boris M.  
Lewis, Annette L.  
Libby, James E.  
Lieberman, Solomon S.  
Lindzey, Gardner E.  
Loehrke, Leah M.  
Lolis, Kathleen  
Long, Luther C.  
Loth, Nancy N.  
Lowenthal, L. Launcey  
Luria, Zella H.  
Lyon, Norman W.  
Maccoby, Eleanor E.  
Macduff, Mary M.  
MacMullen, Marjorie R.  
Maher, Howard  
Mahl, George F.  
Mahler, Clarence A.  
Malamud, Rachel F.  
Mangold, Betty J.  
Marill, Gertrude S.  
Marks, Elsie W.  
Maroney, Verna B.  
Martens, Dorothy  
Mascharka, Leona M.  
McCain, James Allen  
McCormack, William F.  
McGinnies, Elliott M. Jr.  
McNeil, Helen Evelyn  
McWhorter, James E.  
Meroney, Albert H.  
Metzner, Norma R.  
Meyer, Henry D.  
Meyers, Thomas J.  
Michael, William B.  
Millas, Jorge Giménez  
Miller, Helen E.  
Miller, Mungo  
Miller, Robert G.  
Misiak, Henryk  
Mogil, Ruth L.  
Moore, Harriett B.  
Morgan, Jane D.  
Mork, Gordon M.  
Morse, Nancy C.  
Morton, Sheldon I.  
Mosely, Alfred L.  
Myers, Charles R.  
Nance, Lorna S.  
Nardi, Noah  
Nau, Wallace C.  
Nerby, Sheldon H.  
Nevard, Carlisle  
Nevius, Ruth P.  
Newman, Bertha R.  
Nichols, Marie A.  
Nickerson, James F.  
Norris, Kenneth E.  
Obel, Henry  
O'Brien, Cyril C.  
Ochroch, Ruth  
O'Connell, Desmond D.  
O'Kelley, Margery  
Olson, Irene M.  
Onken, Mary A.  
Ortner, Frederick G., Jr.  
Oxtoby, Eloise  
Page, Marjorie L.  
Pasamanick, Benjamin  
Payne, Robert B.  
Peiser, Esther M.  
Pessar, Henry S.  
Peterson, Gustave E.  
Phillips, Ruth  
Pinard, Adrien  
Poch, Susanne  
Porter, Florence S.  
Poruben, Adam, Jr.  
Potter, Muriel C.  
Powell, Lafayette S.  
Price Marie L.  
Princethal, Herman H.  
Pritchard, John W.  
Prosser, Don D.



Ranseen, Emil L.	Shelley, Ernest L. V.	VanMeter, Ruth W.
Ray, Margaret H.	Showalter, Ralph E.	Velde, Rosabel S.
Raylesberg, Daniel D.	Simon, George B.	Waite, William H.
Reader, Natalie	Singer, Mary M.	Walsh, Phyllis C.
Replogle, Frederick A.	Sisney, Vernon V.	Warner, Dorothy M.
Reynolds, John B.	Smith, Calvin S.	Weber, May A.
Reynolds, Susanna B.	Solomon, Marian R.	Weinstein, Samuel
Rice, Edward W.	Soranno, Marie E.	Weitz, Henry
Robins, Eli	Stager, Evelyn M.	Wekstein, Louis
Roman, Robert M.	Standahl, Roy F.	Wells, Jessie M.
Rosen, Hjalmar	Starkweather, Elizabeth K.	Wellborn, Mildred
Rosen, Morton H.	Steisel, Ira M.	Wesley, Elaine
Rosenbaum, Lillian	Stephens, June E.	Wetzel, Floy I.
Ross, Hugh V.	Stewart, Jeannie C.	Wexler, Rochelle M.
Ross, James A.	Stipe, Agnes A.	Wheatley, Mabel M.
Ross, Laurence W.	Stovall, Franklin L.	Wheeler, John A., Jr.
Ross, Verity Mitchell	Strickland, Elizabeth C.	White, Mabel F.
Rubin, Leonard S.	Sutton, Dorothy M.	Wick, Ruth C.
Rubin, Morris M.	Taylor, Gladys E.	Wiederhold, Albert G.
Saavedra, Angel M.	Teicher, Arthur	Wilcox, Shirley M.
Sailer, Randolph C.	Teicher, Joseph D.	Williams, Faith W.
Saltzman, Irving J.	Terkeurst, Arthur J.	Williams, Helen E.
Sayers, Paul T.	Thomas, Ethelbert, Jr.	Williams, Ruth M.
Schaffner, Dorothy R.	Thorn, Katherine F.	Winfield, Don Lacy
Scheele, Joan E.	Thurston, Alice J.	Wirt, S. Edgar
Schmidt, Bernardine G.	Tiedeman, M. Ruth	Witherington, Henry C.
Schneider, Dorothy E.	Tolkoff, Marvin A.	Wood, Carolyn R.
Schulman, Doris	Tomlinson, Helen	Woods, Walter A.
Schultz, Irwin J.	Toobert, Dorothy	Worchel, Philip
Schwartz, Emanuel K.	Toven, Joseph R.	Worchel, Christina
Scott, Winifred S.	Trabeu, Douglas S.	Yohannan, Ephraim
Seeman, Alice R.	Travers, Robert M.	Young, Wilson
Seidman, Frances L.	Treacy, John P.	Zegers, Richard T.
Seidler, Regina	Troxell, Mary Janet	Zuckerman, Stanley B.
Senders, Virginia L.	Turetzky, Estelle	
Shelby, Charlotte F.	Urbina, Pepita L.	

#### The Council of Directors voted:

That the report of the Program Committee, Harold Burt, *Chairman*, be accepted and ordered printed in the Proceedings and that the Committee be discharged with thanks. (See Reports) The functions are provided for by the Convention Program Committee in the new By-Laws.

That the report of the Committee on Precautions in Animal Experimentation be accepted with thanks and ordered printed in the Proceedings and that the continuation of the Committee be recommended to the new Board. (See Reports)

That the report of the Committee on Audio-Visual Aids, Clarence R. Carpenter, *Chairman*, be accepted with thanks and ordered printed in the Proceedings and the question of the continuation of the Committee be referred to the new Board. (See Reports)

That the summary report of the Committee on Investments, Willard Valentine, *Chairman*, be printed in the Proceedings and that the Committee be discharged with thanks. (See Reports) The functions are provided for by a Finance Committee in the new By-Laws.



That the Committee on Scientific and Professional Ethics, L. L. Thurstone, *Chairman*, be commended for its work during the past year and that composition and further duties of the Committee be referred to the new Board. The new By-Laws provide for a standing Committee with the same title.

That the report of the Committee on the Constitution, Ernest Hilgard, *Chairman*, be accepted and printed in the Proceedings, that the Committee be discharged with thanks, and that problems before the Committee be referred to the new Board. (See Reports)

That the report of the Committee on Publicity and Public Relations, R. R. Sears, *Chairman*, be accepted and printed in the Proceedings and that the recommendations be referred to the Committee on Public Relations set up under the new By-Laws. (See Reports) It was further voted that the Committee be discharged with thanks.

That the report of the Committee on the Graduate and Professional Training of Psychologists, Edwin R. Guthrie, *Chairman*, be accepted with thanks, printed in the Proceedings, and the problem of composition, continuation, and unfinished business be referred to the new Board. (See Reports)

That the report of the Committee on the Official Journal, John E. Anderson, *Chairman*, be printed in the Proceedings and that the Committee be discharged with thanks. (See Reports) It was further voted that unfinished business be referred to the new Board and the Committee on Publications established in the new By-Laws.

That the Report of the Committee on Standards for Psychological Service Centers, David Shakow, *Chairman*, be accepted with thanks and printed in the Proceedings and that the question of continuation be referred to the new Board. (See Reports)

That the report of the Committee on Utilization in Psychology of Surplus War Materials, Arthur W. Melton, *Chairman*, be accepted with thanks and printed in the Proceedings and that problems of composition and continuation be referred to the new Board. (See Reports)

That the report of the Committee on Division Organization, Ernest R. Hilgard, *Chairman*, be accepted and ordered printed in the Proceedings and that the Committee be discharged with thanks. (See Reports)

That the report of the Committee on Clinical Psychology, L. F. Shaffer, *Chairman*, be accepted and printed in the Proceedings and that recommendations and problems of membership and continuation be referred to the new Board. (See Reports)

That the report of the Committee on International Planning for Psychology, Herbert S. Langfeld, *Chairman*, be accepted and printed in the Proceedings and that Council recommend the continuation of the Committee to the new Board with its present membership which is identical with a similar committee set up by the National Research Council. (See Reports)

That the reports of the Sub-committees of Council on the Location of Central Office, Robert R. Seashore, *Chairman*, and on Appointive Officers, Dael Wolfe, *Chairman*, be referred to the new Board of Directors for consideration.

That the report of the Representatives to the American Association for the Advancement of Science, Jean Macfarlane and Willard C. Olson, be accepted with thanks, and printed in the Proceedings and that the problem of successors to present representatives (elected without term) be referred to the new Board. (See Reports)

That Horace B. English be continued as a representative to the Committee on Human Relations in Conservation, and that Douglas H. Fryer, formerly a representative from AAAP, be named as a second representative.

That the report of Steuart H. Britt, Representative to the American Documentation Institute, be accepted with thanks and printed in the Proceedings and that the problem of a successor be referred to the new Board of Directors. (See Reports)



That the report of Harold O. Gulliksen, Representative to the American Standards Association be accepted with thanks and that affiliation be dropped until such time as there is evidence of further activity.

That the report of delegates, Forrest Lee Dimmick, *Chairman*, to the Inter-Society Color Council be accepted with thanks and printed in the Proceedings and the question of continued membership in the Council and of representatives be referred to the new Board. (See Reports)

That the report of Theodora M. Abel, Representative to the Committee on Personnel of the National Committee for Mental Hygiene, be accepted with thanks and printed in the Proceedings and that Council recommend to the new Board that Dr. Abel be continued as Representative for the balance of her unexpired term (1944-1947). (See Reports)

That the report of Louis Long, Representative to the National Council of Rehabilitation, be accepted with thanks, ordered printed in the Proceedings, and that questions of continuation be referred to the new Board. (See Reports)

That the report of Leonard Carmichael, *Chairman*, of the Division of Anthropology and Psychology of the National Research Council, be accepted with thanks and printed in the Proceedings. (See Reports)

That the report of the Senior Representative, Walter S. Hunter, to the Social Science Research Council be accepted with thanks and printed in the Proceedings. (See Reports)

That the report of Willard L. Valentine, *Treasurer and Business Manager*, accompanied by a report of the Auditors for the year ending December 31, 1944, be accepted with thanks and printed in the Proceedings. (See Reports)

The business before the retiring Council of Directors was completed at 3:30 p.m. on Thursday, September 6, 1945. The new Board of Directors who had been present as observers up to this time now took their places and the retiring President, Edwin R. Guthrie, turned over the Chair to the new President, Henry E. Garrett. All elected members of the Board were present. Willard C. Olson, the retiring secretary, was elected as the *Recording Secretary pro tem* under the new By-Laws.

Gardner Murphy, Chairman of the Election Committee, had reported to the Secretary that the membership had approved the emergency legislation on the following proposition by a vote of 1,238 to 95:

In case wartime conditions prevent a quorum of the newly elected Council of Representatives from meeting in September 1945, Article VIII, Section 1 and 5 of the By-Laws effective in September 1945 shall be interpreted to permit a mail vote of the Council of Representatives on the call of the newly elected President to nominate and elect members of the Board of Directors, at the same time turning over emergency powers to the newly elected Board of Directors. The declarations of emergency powers requires a two-thirds vote of the Council.

On the call of President Garrett, as authorized by the poll, the following resolution of emergency was sent to the new Council of Representatives and endorsed unanimously (44 replies) by them:

WHEREAS, restrictions on travel prevent an Annual Meeting of the American Psychological Association, and WHEREAS a meeting of the Council of Representatives with the present Council of Directors and officers will exceed fifty, and WHEREAS Associates and Members of the Association have unmistakably indicated by a mail poll their willingness to have Council take emergency measures, BE IT RESOLVED that the Council of Representatives declare the existence of an emergency and proceed to elect a Board of Directors by mail ballot, and BE IT FURTHER RESOLVED that the Council of



Representatives delegate to said Board of Directors the power to act for Council and the Association in all matters which may properly come before it at a meeting to begin in Evanston, Illinois, or vicinity, on or about September 6, 1945.

A nominating poll and a final preferential poll was conducted and the following persons were elected to the new Board of Directors: John F. Dashiell, R. M. Elliott, William A. Hunt, Robert R. Sears, C. L. Shartle, E. C. Tolman. *President* H. E. Garrett and *President-elect* Carl Rogers automatically are members of the Board.

The retiring Council of Directors requested the Secretary to keep open the question of whether a meeting of the Council of Representatives should be scheduled for Evanston in the period September 6-7-8, 1945 in case of late changes in transportation regulations. When the ceiling in attendance was raised to 150, the Secretary organized a poll of the Council of Representatives which was mailed with a covering letter and the agenda of the Directors meeting on August 20, 1945. Replies were complete on August 31, 1945 with 23 *for*, 23 *against*, 2 not voting on the item, 1 deceased, and 4 inaccessible because they were abroad. No action, therefore, was taken to call a meeting.

In the same poll, the new Council made it permissive for various groups and officers to meet if they had business to transact. A letter to this effect was sent to divisional officers on August 31, 1945.

It was explained that the meeting of the Board was, in effect, also a meeting of the Council of Representatives, since Council had delegated its powers in emergency legislation. All actions taken thus become final actions.

In order to establish continuity in the financial affairs of the Association the Board voted to elect Willard Valentine as *Treasurer* for a five year term.

The Board voted to elect Donald Marquis as *Recording Secretary* for a three year term.

The Board of Directors next took up the items on the prepared agenda and voted:

That all Associates and Members who have applications in process on the old forms should be allowed to complete them and that the evidence therein contained should be utilized for election to Associate and Fellow respectively under the new Constitution.

To delegate to the Executive Secretary, the Recording Secretary, and the Retiring Secretary the problem of devising suitable new forms for the categories of *Student Affiliate*, *Associate*, and *Fellow*.

That the Executive Secretary be instructed to admit a class of Student Affiliates beginning on January 1 of each year. It was further voted that biographical entries should not be made in the main body of the A-Z directory in the yearbook for student Affiliates and Division Affiliates. It was voted to postpone other decisions for recommendations from the Committee on Student Affiliates.

The Board next considered the committee structure as described in the new By-Laws and voted:

To appoint John G. Darley as *Chairman* of the *Committee on Committees* and to name the Committee with staggered terms as follows: John E. Anderson, 1945-46, Alice Bryan, 1945-47, Claude Buxton, 1945-48, John G. Darley, 1945-49, and R. H. Seashore, 1945-50.

To name Treasurer Willard Valentine as *Chairman* of the *Finance Committee*, with Leonard Carmichael, Samuel W. Fernberger, C. M. Louttit, and Dael Wolfe as added members.



To name Dael Wolfe as *Chairman* of the *Convention Program Committee* with the term 1945-46 and with Douglas Fryer, 1945-47 and Carl Hovland, 1945-48 as added members.

To name Calvin Stone as *Chairman* of the *Committee on Scientific and Professional Ethics* with the term 1945-46 and with additional members and terms as follows: Calvin Stone, 1945-46, Edwin Guthrie, 1945-47, Gordon Allport, 1945-48, Horace English, 1945-49, and Edgar Doll, 1945-50.

To appoint the following *Election Committee* as specified in the By-Laws: Edwin R. Guthrie, Gardner Murphy, A. T. Poffenberger, and Carl R. Rogers. It was subsequently reported that A. T. Poffenberger had been elected *Chairman* by the Committee for the succeeding year as specified in the By-Laws.

To appoint John Peatman as *Chairman* of the *Committee on Student Affiliates* with the term 1945-46 and with the following added members with terms as shown: Stuart Cook, 1945-47, R. C. Tryon, 1945-48, Francis P. Robinson, 1945-49, and Beth Wellman, 1945-50.

The Board voted:

To name Robert R. Sears as *Chairman* of the *Committee on Public Relations* for the term 1945-46 with Alice I. Bryan for the term 1945-47 and with Sidney Pressey for the term 1945-48.

To designate William Hunt as *Chairman* of the *Committee on Publications* for the year 1945-48 with Frank A. Beach 1945-46 and Alvin C. Eurich 1945-47 as additional representatives from the Council of Representatives. It was further voted that the following persons should be elected to the Committee to represent the Board of Editors: Herbert S. Conrad, 1945-46; Gordon Allport, 1945-47 and John E. Anderson, 1945-48. President Henry Garrett and President-Elect Carl Rogers will also be ex-officio members of the Committee on Publications.

To name the following nine persons to the *Policy and Planning Board* with terms as designated and with Edwin G. Boring as *Acting Chairman*: For the term 1945-46: Edwin G. Boring, Carlyle Jacobsen and Rensis Likert; for the term 1945-47: Donald Marquis, Laurance F. Shaffer, and Lloyd N. Yepsen; for the term 1945-48: Marion A. Bills, Ernest Hilgard, and Ruth Tolman.

The Board voted to continue for 1945-46 the following former committees of the Association with membership as shown:

*Committee on Precautions in Animal Experimentation*: Roger Loucks, *Chairman*, Frank Beach, and Howard F. Liddell; *Committee on Audio-Visual Aids*: Clarence R. Carpenter, *Chairman*, Lester F. Beck, *Co-Chairman*, Kenneth Baker, Wayne Dennis, Mark May, and S. M. Corey; *Committee on the Graduate and Professional Training of Psychologists*: Sidney L. Pressey, *Chairman*, R. M. Elliott, Elaine Kinder, Donald Marquis, Bruce V. Moore, A. T. Poffenberger, Robert Sears, and Carroll Shartle; *Committee on Standards for Psychological Service Centers*: Jerry W. Carter, *Chairman*, Katharine M. Banham, Wilma Donahue, Jean Macfarlane, Morton A. Seidenfeld and Lee Edward Travis; *Committee on Utilization in Psychology of Surplus War Materials*: Arthur Melton, *Chairman*, Charles W. Bray, Paul M. Fitts, and Carroll L. Shartle; *Committee on Clinical Psychology*: Laurance F. Shaffer, *Chairman*, Stuart W. Cook, William A. Hunt, Carlyle Jacobsen, Donald Marquis, and Frederick C. Thorne; *Committee on International Planning for Psychology*: Herbert S. Langfeld, *Chairman*, Walter S. Hunter, Walter R. Miles, and Robert M. Yerkes.

In taking the foregoing actions it was further voted that the Committee on Committees should study the functions and personnel of the committees and should make recommendations concerning continuation and personnel at the 1946 meeting.



The Board of Directors voted:

To continue Jean Macfarlane and Willard C. Olson as the *Representatives* to the *Council of the American Association for the Advancement of Science*.

To continue Steuart H. Britt as *Representative* to the *American Documentation Institute*.

To continue representation in the *Inter-Society Color Council* with the present delegation and with Forrest Lee Dimmick as *Chairman*.

To continue affiliation with the *National Council for Rehabilitation* and to reappoint Lewis Long as *Representative* of the Association.

To reappoint Theodora M. Abel as *Representative* to the *Division of Personnel* of the *National Committee for Mental Hygiene* for the term 1945-47.

To maintain associateship membership in the *American Council on Education*.

The Board of Directors turned to the consideration of publication problems at 10:30 a.m. on Thursday, September 7. John F. Dashiell, Editor of the *Psychological Monographs*, and Willard Valentine, Business Manager of Publications, represented the Board of Editors of the APA. Bertha Luckey, Chairwoman of the Board of Editors of the AAAP, Jerry Carter, Business Manager of Publications for the AAAP, and Herbert S. Conrad, Editor of the *Applied Psychology Monographs* of the AAAP, were present by invitation.

Mimeographed summaries of the reports of the Editors on the status of journals as of June, 1945, were distributed for information. It was announced that Samuel W. Fernberger had been elected Chairman of the Board of Editors at their meeting in Philadelphia on February 17, 1945.

A proposal to turn over the *Archives of Psychology* to the Association had been under consideration for some time. The Board of Directors voted that the Association accept the kind offer of Professor Woodworth of the *Archives of Psychology* and turn over to the Committee on Publications problems of the future of the publication including editor, relations to the Association's journals, and other policies.

The Committee on Official Journal had presented a comprehensive report outlining a new publication to be called *The American Psychologist*. The creation of such an Official Journal in the immediate future was now possible because of the easing of paper restrictions. The Board of Directors voted to approve the report of the Committee on the Official Journal and to instruct the new Executive Secretary to start such a journal beginning with an issue in January, 1946.

The Board voted that for 1946 Fellows, Associates, and Student Affiliates, should receive the *Abstracts*, the proposed *American Psychologist*, or other official journal, and the *Yearbook*. It was voted that all classes, including Division Affiliate, should have the privilege of subscribing to the Association's publications at the club rate.

The expansion of the publishing enterprises of the Association calls for a reconsideration of the subject matter field covered by journals now published and by prospective journals. The Board of Directors voted to refer matters concerning subject matter fields of journals and prospective journals and their disposition to the Committee on Publications.

Upon recommendation of the Board of Governors of the AAAP, the Board of Directors accepted the following recommendations of the Board of Editors of the AAAP:

1. That the present *Journal of Consulting Psychology* be continued, minus the official house-organ functions, for the volume year 1946;



2. That the APA take under consideration the matter of continuing the *Journal of Consulting Psychology* after the volume year 1946 in whatever form may best meet the needs for a publishing medium in the practice of psychology as distinguished from psychological research in clinical, educational, and industrial fields; and
3. That the present Editor and Business Manager be reappointed for the 1946 volume year.

Carl Rogers, President of AAAP, announced that the Board of Governors had appropriated funds from the balance remaining in the treasury sufficient to cover the cost of continuing the *Journal of Consulting Psychology* and mailing it to the present member subscription list for the volume year 1946.

Upon recommendation of the Board of Editors and Board of Governors of the AAAP, Herbert F. Conrad was elected as Editor of the *Applied Psychology Monographs* for 1946. This election continues his work begun under the AAAP.

The Board voted to approve the continuation of the contract with Stanford University Press for the *Applied Psychology Monographs* for an additional year and to refer questions of future policy to the Committee on Publications.

The Board voted to refer to the Committee on Publications the information secured from the previous Electoral Board on possibilities for an Editor for the *Journal of Experimental Psychology* for the term beginning January 1, 1947.

The increase in length in the list of publications of the Association raised the question of whether all periodicals should be included in a single club subscription. After discussion the Board voted that Treasurer Valentine be authorized to devise various club combinations with prices and to offer the same to members.

The increase in the Association's activities with the numerous changes of addresses in the period of transition had placed an additional burden and expense on the office of Business Manager. After discussion the Board voted to appropriate \$400.00 to reimburse Willard Valentine for services during August and September.

To perfect transitional relations the Board voted that Willard Valentine should continue as *Business Manager of Publications* for the balance of the current year.

There was extended discussion of a desirable location for the Central Office of the APA. The experience with the Office of Psychological Personnel and of Washington observers gave large weight to the importance of a location near to agencies of government already established and those contemplated in an expansion of research with government support. The post-war establishment will continue to use a substantial number of psychologists. A location at Washington does not commit the Association to a place of Annual Meeting which could be held at various points for the convenience of the members. Literature and correspondence had also been received indicating a future possibility of negotiating with the AAAS for space in a structure under contemplation.

The Board voted unanimously as follows:

That the Central Office be established on a fully adequate basis in Washington, D. C. That a Committee be appointed by President Garrett to investigate available locations and, with the mail approval of the Board, to complete arrangements for the offices. It was further voted that the sum of \$300.00 be allocated for meeting the expenses of travel in securing a location. President Garrett appointed Willard Valentine as *Chairman* of the *Committee on Central Office*, with Donald Marquis, Walter Miles, and the new Executive Secretary as members.



It was further voted that a Committee be appointed by the President to negotiate with the AAAS looking forward to the provision of a permanent home for the central office in Washington. President Garrett subsequently appointed Leonard Carmichael as *Chairman*, and John G. Jenkins and Walter Miles as members.

There was extended discussion of possible candidates for the new post of Executive Secretary. The Board had before it the report of the Committee on Appointive Officers of the retiring Council of Directors and also proceeded to a study of additional suggestions made by each member of the Board. A tentative list of possibilities was compiled and the Board voted to authorize President Garrett, Treasurer Valentine, and Recording Secretary Marquis to negotiate for an Executive Secretary to begin work as early as possible with such transitional arrangements as might be imposed by previous agreements.

There was discussion of transitional planning for the present offices of the Association in relationship to the new offices. It was voted that the stipend for the office of the former Secretary as established at the September 1944, Annual Meeting should be continued through the calendar year 1945 and that the retiring Secretary should complete the work of the September 1945, meeting and maintain such activities as may be essential until a complete transfer of duties is accomplished.

Since a number of uncertainties still surrounded the appointment of an Executive Secretary the Board voted to allocate the sum of \$800.00 as a contingency fund to be drawn upon by the Business Manager and retiring Secretary as needed for the payment of extra expenses of the offices for the balance of the current year.

The Board voted that the Officers of the Association be authorized to make suitable arrangements for the establishment and continuity of the work of the central office pending appointment of the Executive Secretary.

It was voted that the Executive Secretary be empowered to employ within the budget such staff as might be necessary for the conduct of the Central Office.

There was a discussion of the termination of the Office of Psychological Personnel in Washington, D. C. The office was operated under the auspices of the National Research Council with the financial assistance of the APA and AAAP and is to terminate on December 31, 1945. Some time after the creation of the OPP an Office of Scientific Personnel was organized embracing a large number of scientific fields. The OSP will continue with headquarters at the National Research Council. Donald Marquis reported on possible relationships with the OSP. It was voted that, if satisfactory arrangements can be made, the Association should participate in and contribute to the Office of Scientific Personnel beginning January 1, 1946.

The Board voted stipends to the office of Treasurer and to the office of Recording Secretary at the rate of \$400.00 each per year for the remaining months of 1945 and for 1946.

The Board voted to purchase the name and good will of the American Association for Applied Psychology for \$1.00 and other valuable considerations.

The By-Laws provide for an annual subscription of \$15.00 for Fellow, \$10.00 for Associate, \$5.00 for Student Affiliate, and \$2.00 for Division Affiliate. In addition the By-Laws provide for a charge of \$1.00 for all additional divisional affiliations beyond one. It was decided that it might be necessary to construct the bill so that additional charges for divisional affiliation would enter into the



total and that it might be necessary for an interim period to permit persons to elect to belong to the new divisions even though they did not eventually qualify. It was agreed that \$1.00 per member should be set aside in the new budget for the work of the divisions.

According to the report of the Treasurer, 1944 was a record year in the allocation of funds to surplus and 1945 promises to be likewise. The condition of current operations and the surplus insures a stable organization from a financial point of view. The preliminary budget presented by Willard Valentine indicated that the Association could undergo the contemplated expansion with an adequate margin for contingencies. The Board voted to approve the tentative consolidated budget for the Association for 1946. (See Reports). In taking this action it was suggested that the budget be reviewed at a subsequent meeting.

The Committee on the Constitution had made substantial progress in formulating tentative changes in By-Laws to be submitted to the Association on problems of state representation on the Council. The Committee had met in Washington on April 22, 1945 with representatives of the Board of Affiliates of the AAP. After some discussion in the Board of Directors the continuation of the work was referred to the new Policy and Planning Board. In the meantime, to assure continuity of study, it was voted that the Interim Committee of Affiliated Societies be invited to elect three representatives to attend the next meeting of the Policy and Planning Board for a discussion of the problem of representation of state societies and to elect a representative to attend the next meeting of the Board of Directors and the Council of Representatives. It was further voted that the Executive Secretary, or in the interim prior to his appointment, the Office of Psychological Personnel, be instructed to assist the state societies in the integration and dissemination of information concerning their activities.

The new By-Laws of the Association make a provision for special representatives of groups not qualifying as divisions of the Association but with reason to be represented by virtue of relations to the objectives of the Association. In accordance with this article it was voted to invite the Department of Psychology of the American Teachers Association to elect a representative, if they so desire, to become a representative to the Council. The invitation was accepted and Herman G. Canady was elected as a representative.

The Council of Representatives, in deciding against calling a meeting of Council at Evanston, indicated its desire for the Board to give attention to the desirability of a meeting prior to the next regular annual meeting of the Association. It was voted to hold the next meeting of the Board of Directors at Columbus, Ohio in the week after Christmas and to call a meeting of the Council of Representatives and of divisional officers. The agenda for such a meeting is expected to include reports from the new Committee on Publications, the Policy and Planning Board, reports on progress on the location of offices and on the appointment of the Executive Secretary, and other matters of general interest. It was suggested that such a meeting should include a conference of Divisional Officers and Representatives to consider By-Laws for Divisions and to exchange experiences and wishes on organizational matters.

The Board voted to delay until the next meeting of Board and Council the question of the time and place of the next Annual Convention of members.

By vote of the Board the retiring Secretary was instructed to send the following message to the Social Science Research Council:



The American Psychological Association requests the Social Science Research Council to take whatever action is feasible to insure the inclusion of the social sciences in the National Research Foundation or any other national agency set up for scientific research with federal support.

It was further voted that the same message should be sent to officials of the AAAS.

R. M. Elliott, Robert Sears, and Carl Rogers were instructed to send a telegram to President Truman commending him on his recent statement including the social sciences in research to be supported by government and urging him to insure the inclusion of the social sciences in any agency set up for scientific research with federal support. The following message was sent on September 8.

President Harry S. Truman  
The White House  
Washington, D. C.

The American Psychological Association, meeting in Evanston, Illinois, strongly commends the section of your recent message to Congress which proposes a single federal agency for cooperative scientific research. The events of the war years and especially of recent weeks have demonstrated to thinking men the need for the inclusion of the social sciences as an integral part of this vast project. Our need for an understanding of man and his ways was never so great. The first and primary defenses against the destructiveness of atomic energy will always lie in the cooperative institutions of mankind.

For the Association  
DONALD G. MARQUIS,  
*Recording Secretary*

Upon recommendation of the Committee on Clinical Psychology, the Board adopted the following resolution:

The American Psychological Association, at its regular annual meeting September 8 in Evanston, Illinois, voted approval of the purposes and general provisions of a bill to establish a National Neuropsychiatric Institute (H. R. 2550, S 1160). The problems of neuropsychiatric disorders are of vital concern to the national welfare, and their magnitude demands a coordinated attack by all of the sciences and professions devoted to the study and treatment of such disorders.

The Board unanimously adopted the following resolution:

RESOLVED: that the Board of Governors of the AAPA, the retiring Council and new Board of Directors of the APA express to Dr. R. M. Yerkes their appreciation of his initiative, vision, and persistent constructive endeavor in bringing about at this highly opportune time the merger of the various psychological organizations previously existing into a new structure of new and great potentialities for the development of the future of our Science.

The Board voted its thanks to the retiring Secretary and instructed him to send letters of appreciation to officials of the National Research Council for the facilities provided for the Office of Psychological Personnel, and to representatives of Northwestern University for the work of the annual meeting.

The meeting of the Board of Directors adjourned at 4:30 p.m. on Saturday, September 8, 1945.



## REPORTS

## REPORT OF THE APA PROGRAM COMMITTEE

*To the Council of Directors and Members of the American Psychological Association:*

In October, 1944, the Committee began making plans on the assumption that there would be a full-scale meeting in September, 1945. It was obvious that at such a meeting and probably for several of the succeeding meetings we would be deluged with papers which had been dammed up during the moratorium on meetings. It was apparent that the Committee would have to make a very rigorous selection and that it would be wise to develop a systematic and equitable procedure. Accordingly we collected from various interested parties a list of criteria to be used in evaluating a paper. After some correspondence the Committee tentatively agreed on seven variables, developed a very simple point rating scheme for each variable, and weights for each variable. It was proposed to have copies of abstracts submitted to members early enough so that they could read them all, make their ratings, and have the results assembled prior to the actual physical committee meeting.

About the first of the year the Office of Defense Transportation issued its ultimatum. The Committee's files are now frozen until such time as a regular meeting is in prospect.

The Chairman of the Committee feels that he has fulfilled the obligations of that appointment and should be relieved. Normally the chairman serves for one year. The present incumbent began his chairmanship in 1943 and conducted a lot of correspondence, but the program finally was abandoned. In 1944 the program for the Cleveland meeting was arranged. This consisted of invited papers but involved a lot of work. In the present year the Committee has done a modicum of work as indicated above. The chairman suggests that he does not deserve a *Fourth term*.

Respectfully submitted,  
WILLARD C. OLSON  
DAEL WOLFLE  
HAROLD E. BURTT, *Chairman*

## REPORT OF COMMITTEE ON PRECAUTIONS IN ANIMAL EXPERIMENTATION

*To the Council of Directors and Members of the American Psychological Association:*

A. *Activities During Current Year.* Through the courtesy of the Bureau of Legal Medicine and Legislation of the American Medical Association, the Committee on Precautions in Animal Experimentation has been kept informed of the introduction of new legislation in various states of the country, which was calculated to be against the interests of scientific research with animals.

During the present year, seven such bills were introduced, two in New York state, designated as S1028 and A1641; two in Pennsylvania, H377 and H1022; one in Wisconsin, A146; one in Massachusetts, H1250; and one in Texas, H797. As judged by earlier reports of the Committee on Precautions in Animal Experimentation, the lobbying against research with animals has been unusually extensive during the present year.

Upon receipt of information about these bills, letters were immediately dispatched to department heads, comparative psychologists, and physiological psychologists in the states mentioned. These letters urged those written to take action against the bills. Wherever possible, relevant excerpts from the bills were quoted. The response of the psychologists addressed was extremely gratifying and many wrote the committee describing special action taken and enclosing copies of letters sent to legislators against the bills. As far as our information to date goes, all of these bills were successfully defeated.

B. *Proposed Continuance of Committee.* In view of the reorganization of the APA, a



question has been raised about the desirability of continuing the Committee on Precautions in Animal Experimentation. The committee does not quite see how the reorganization of the APA would in any way affect research with animals by members of the APA. We surely do not wish to run the risk of having some of our animal laboratories closed by taking no action at all when legislative threats against this type of research arise. In the opinion of the present committee, there can be no question of the need for some sort of a center or office to defend the scientific interests of psychologists working with animals, against interference on the part of well-meaning but misguided sentimentalists.

The only possible change which might be suggested, would be to make the committee a committee of one of the divisions of the APA instead of a committee of the APA as a whole. It might, for example, be made a committee of the Division of Physiological and Comparative Psychology. The disadvantage of this latter procedure, however, would be that persons belonging to other divisions, such as the Division of General Psychology, the Division of Theoretical-Experimental Psychology, the Division of Abnormal Psychology and Psychotherapy—all of which will undoubtedly include members who do research with animals—would not be fairly represented.

Respectfully submitted,  
ROGER B. LOUCKS  
W. J. BROGDEN  
W. N. KELLOGG, *Chairman*

#### REPORT OF THE COMMITTEE ON AUDIO-VISUAL AIDS

*To the Council of Directors and Members of the American Psychological Association:*

The problems which should have been attacked and solved completely, or in part, by the Audio-Visual Aids Committee (AVA) are many and important. In relation to these the efforts and the accomplishments of the Committee have been inadequate, therefore, much work remains to be done.

The AVA has continued to represent the interests of the APA in relation to the formative organization now known as Science Films. This organization covering the broad fields of biological sciences is still being formed. The APA is represented among the five charter science associations. The AVA Committee has been able to make contributions to the planning operations of Science Films. This work has promise of being very important and should be continued.

It is possible that many of the problems of selection, production and distribution of films related to the general fields of psychology may best be solved by cooperative efforts channelled through Science Films.

Two members of the AVA Committee have continued efforts to review audio-visual aids used by the military forces. During the next year it will be extremely important for the APA to have its interests effectively represented in Washington in order to insure that those audio-visual aids previously used in military services be made available on a practical basis to psychologists. To this end official action should be taken by the APA Council.

The AVA Committee has not fulfilled its responsibility in connection with the job of keeping in touch with plans and developments for producing 16 mm science training films. Vague information indicates that a number of commercial companies have been or are being formed for this purpose. Few developments have taken place in colleges and universities. The opportunity has been and still is present to interest various foundations in some phases of production problems.

During the year a study was made of 16 mm films suitable for instructional purposes and in use in psychology instruction. The Committee has prepared a list of these films. Also, a list of films produced by psychologists has been compiled. Furthermore, the AVA



Committee has fairly reliable and complete information about production capabilities of individuals and institutions. In addition, about forty letters have been received suggesting subject matter content for new films. It is clear that the APA should actively support efforts to produce generally useful instructional films.

There is still a lack of coordination of film production and distribution. As a result there exists some duplication of efforts. Furthermore, available audio-visual aids are not fully utilized. These problems should be made the responsibility of the Central Office of the Association. Perhaps the Central Office could at least serve as a clearing house of information about audio-visual aids. Most certainly this possibility should be carefully considered by those who plan the structure and write the directives for the Central Office.

In conclusion, it would seem that the work of the AVA Committee is importantly related to the general problem of improving psychological instructional procedures. It is suggested, therefore, that the functions of the AVA Committee be coordinated with the sections of the Association concerned with instruction.

#### *Recommendations*

1. That the Council appoint a representative to Science Films.
2. That the Council appoint a representative who is or will be in Washington to work on the problem of securing those audio-visual aids from military services and making them available for teaching purposes to members of the Association.
3. That the Council designate an individual whose responsibility it will be to keep fully informed about the production situation of all audio-visual aids.
4. That the Council provide personnel and facilities for coordinating the production, distribution and use of audio-visual aids.
5. That the Council provide for the continuation of the functions which have been carried on by the AVA Committee in the newly organized Association.

Respectfully submitted,

LESTER F. BECK

MARK A. MAY

WILLARD L. VALENTINE

CLARENCE R. CARPENTER, *Chairman*

#### REPORT OF THE COMMITTEE ON INVESTMENTS

*To the Council of Directors and Members of the American Psychological Association:*

The surplus funds of the Association as of December 31, 1944, amounted to \$86,002.16 which was invested in ten savings banks, in U. S. Savings Bonds, and Chesapeake and Ohio Railway Company refunding and improvement Mortgage Bonds. The total income was \$1,489.23.

There are two accounts included in the amounts shown above which have been designated for special purposes; one of these, a sum set aside for post-war reconstruction of psychology, now amounts to \$3,229.84; the other, representing a surplus in the account of the *Journal of Abnormal and Social Psychology* to be used only for this journal, amounts to \$6,683.91. This leaves a free capital investment of \$75,088.41, compared with \$61,638.89 at the close of 1943.

Respectfully submitted,

LEONARD CARMICHAEL

SAMUEL W. FERNBERGER

WILLARD L. VALENTINE, *Chairman*



## REPORT OF THE COMMITTEE ON THE CONSTITUTION

*To the Council of Directors and Members of the American Psychological Association:*

This Committee originated as a joint committee of the AAAP and the APA with the new member, Dr. Yepsen, jointly appointed by Dr. Rogers as president of the AAAP and Dr. Guthrie as president of the APA.

After preliminary correspondence the Committee met in Washington on April 22, 1945 and there prepared some tentative proposals for revision of the amended By-Laws.

While some dissatisfaction with the present divisional structure was evidenced, the Committee felt that it would be better to make readjustment after the experience of the election of 1945 than to attempt to propose another set of divisions without that experience.

In view of the importance of the state as the political unit for certification, the Committee prepared a revision of Article 5 substituting state representation for regional representation. Copies of this proposal were circulated to a number of local societies for comments and criticisms. It became evident that while the principle of state representation was favored there were matters of detail not sufficiently worked out in the Committee's proposal. The Committee members by mail vote agreed to postpone action and not to submit the tentative amendment to mail vote at this time.

Further work on these problems should probably be assigned to the new Policy and Planning Board created by Article 12 of the amended By-Laws. The Chairman has a considerable body of correspondence bearing on the problems which can be placed at the disposal of whatever group is instructed to carry on.

Respectfully submitted,

JOHN E. ANDERSON

ALICE I. BRYAN

C. M. LOUTTIT

SIDNEY L. PRESSEY

WILLARD L. VALENTINE

LLOYD N. YEPSEN

E. R. HILGARD, *Chairman*

REPORT OF THE COMMITTEE ON PUBLICITY  
AND PUBLIC RELATIONS

*To the Council of Directors and the Members of the American Psychological Association:*

The impending changes in Association structure and the rapidly growing professional responsibilities assumed by psychologists in many fields are creating new public relations problems. These are most apparent, to practicing psychologists, in the realm of inter-professional relations; expanding knowledge breeds a desire to apply the knowledge, and to attain higher status in the hierarchy of professions. But becoming expert also entails social responsibility, and in the opinion of your committee the Association should accept the obligation of informing the public on psychological matters pertaining to the general welfare.

Various needs are apparent at the present time. One of the most serious, if also least tangible, relates to lay understandings of psychological matters. It is not far wrong to say that modern lay psychology is the technical psychology of the Eighteenth Century. The subjectivism and dualism of Locke and Descartes pervade contemporary thinking, and motivation is conceived as a voluntaristic aspect of consciousness. The same cultural lag exists in respect to other sciences; lay physics resembles Newton's, not Einstein's. But in no other science does this intellectual anachronism carry such an ill prognosis for human welfare. In course of time, modern deterministic and behavioral concepts will be ingested into lay psychology, but some consideration should be given to speeding up the process.



Happily there are many channels by which this can be done at the same time that a more tangible problem of public education is being attacked. The enlightened use of aptitude tests, opinion polls, psychophysical methods, and training methods does not await detailed understanding, by the consumer, of a systematic theory of behavior. There are many areas in which society could benefit from the application of psychological procedures. Labor relations, management organization, and consumer needs have recently been the subject of effective approaches by psychologists, and the ingenuity of the profession will undoubtedly lead to many as yet untouched fields after the war.

Much wider use could profitably be made of clinical services and information concerning child development. Although both these fields have been exploited for many years, public understanding of their potentialities is still inadequate. This is equally true of the applications of psychology in the school.

In all phases of application the professional psychologist comes in competition with quacks and incompetents. Such extreme absurdities as astrology and fortune-telling are of little importance, but more subtle pseudo-scientific practitioners represent a real hazard to social welfare. Perhaps even more serious is psychological practice by reputable, but psychologically untrained, members of other professions. Lawyers, physicians, social workers, engineers, ministers are frequently forced into the position of giving advice on matters for which they have but lay competence. Criticism of this situation is useless until there are enough competent psychologists to whom problems may be referred, and until these other professions, as well as the general public, have been adequately informed of the special competences possessed by psychologists.

It is to this educational process that your committee recommends the Association should turn its attention. Various methods may be considered. For some, the services of a thoughtful committee would be required, and for others the duties could be carried out by the executive secretary and his assistants. In general, matters that concern policy formation or the preparation of extensive materials should originate with the Committee, while the execution of approved projects might be placed in the Secretary's hands.

Among the methods of public education that your committee wishes to bring to the attention of its successor are the following:

1. Preparation of popular magazine articles to present to a wide audience the achievements of scientific psychology, not only in its application but in its more general research phases. Chemistry, biology, physics and medicine have been much more effectively popularized than has psychology through this medium.
2. Development of a syndicated column for newspapers. The extraordinary success of medical, legal advice and child training columns suggests the possibility that an authoritative column on psychological problems could be of considerable value.
3. Regular press releases on new research findings.
4. Inauguration of an official popular magazine to compete with the pseudo-scientific magazines published at present.
5. The publication of authoritative booklets on the fields of application of psychology. These would be directed at intelligent users of psychological services, whether they be employers of psychologists or members of other professions whose duties overlap with psychology. The aim would be to present adequate information about psychologists' skills.
6. Assistance to radio networks and independent stations in preparation of educational series relating to psychology.
7. Assistance to public libraries in preparing bibliographies of psychological literature in various fields for use of their readers.

Most of these channels for public education require talent and skill quite beyond those



of most professional psychologists. Two alternatives offer themselves: the assistance of professional science writers could be secured, or talented students of journalism could be trained in psychology and vice versa. Psychologists are not, in the main, particularly competent as popularizers and adult educators. More attention might well be given, by at least a few graduate departments, to training in journalistic and radio techniques along with regular professional training.

Consideration might be given, further, to providing incentive for such activities. An annual award for the best popular book or article might be made. Much of the work envisioned in these suggestions must necessarily be the product of individual initiative, and the Association might well look on the popularization of information about psychology as simply one additional field in which encouragement and assistance could be given by the official body of psychologists to its individual members who seek to be productive in this field.

Not all of the suggestions should be left to individual initiative, however. Informational booklets ought to be prepared under the guidance of an Association committee, and the general problem of presenting the organized profession's position and policies could not with any propriety be handled without group action.

In addition to the more general problems of public education, there are various matters that concern the professional activities of Association members. With increasing scope of action, there will undoubtedly be more legislation that affects psychologists. Some of this may prove restrictive if it is instigated without consultation between legislators, or their backers, and psychologists. The new position of executive secretary might well be intrusted with a watching brief on such matters.

New directions for the expansion of the profession have been suggested by many people. Psychological training should be incorporated in schools of engineering, medicine and nursing; animal psychology could profitably be taught in agricultural colleges; child development is widely considered a serious need at the secondary school level. Much of the spade work needs to be done in finding the most useful kinds of teaching for these non-psychological students. A committee should undertake the preparation of portfolios of information about the procedures used in different institutions, and should make these available both to psychologists who are creating new educational channels for themselves and to administrative officers of the neighboring fields that might make use of psychological training.

Finally, there is the problem of press coverage of Association events. The Publicity and Public Relations Committee has taken care of this duty in the past with varying degrees of success. This has often required the assistance of the public relations officer or the Department of Journalism at the host institution. Your committee recommends that this task be allocated to the executive secretary of the Association hereafter and that he be authorized to prepare and distribute press releases concerning elections of officers, research reports, and other business of the Association that may have interest for the general public.

It is further recommended that a Committee on Publicity and Public Relations be appointed by Council with instructions to evaluate the kinds of problems described in this report, and others that may be equally relevant to the Association's social and professional responsibilities, and to prepare plans, in consultation with the executive secretary, for the activation of an association policy in respect to Public Relations.

Respectfully submitted,  
ALICE I. BRYAN  
SIDNEY L. PRESSEY  
ROBERT R. SEARS, *Chairman*



# COMMITTEE ON THE GRADUATE AND PROFESSIONAL TRAINING OF PSYCHOLOGISTS

*To the Council of Directors and Members of the American Psychological Association:*

The Committee met in Cleveland, September, 1944, and decided to undertake a program of survey and research to lay a sound foundation of fact for its consideration of recommendations for improvement and standardization of graduate training programs. It undertook to sponsor in collaboration with other committees the following three projects during the year.

a. With the Office of Psychological Personnel to analyze the results of the survey of psychologists in 1944 to determine the functions actually performed by employed psychologists in relation to their type of employment and their general educational background.

b. With the Subcommittee on Occupational Standards of the Emergency Committee of the National Research Council, Carroll Shartle as Chairman, to carry out a job analysis of the fields of psychology, preparing job descriptions and qualifications in the several specialized fields of psychological employment.

c. A survey of existing training facilities in the graduate departments of psychology. The questionnaire for this purpose has been prepared and is being circulated to the Chairmen of the psychology departments of 75 universities.

On the basis of these factual data the Committee proposes by conference and consultation to:

1. Formulate a statement of optimal training program for the Master's degree and the Doctor's degree in psychology, including specialized training for the several professional specialties.

2. To prepare a booklet for the guidance of undergraduate and graduate students on the opportunities for careers in psychology, including statements of desirable qualifications and training for such careers.

Respectfully submitted,

J. ELLIOTT JANNEY

DONALD MARQUIS

BRUCE V. MOORE

SIDNEY L. PRESSEY

ROBERT R. SEARS

C. L. SHARTLE

WILLARD VALENTINE

EDWIN R. GUTHRIE, *Chairman*

## REPORT OF THE COMMITTEE ON OFFICIAL JOURNAL

A LIAISON COMMITTEE OF APA AND AAP TO FORMULATE RECOMMENDATIONS ON  
POLICIES WITH RESPECT TO THE OFFICIAL JOURNAL OF THE REORGANIZED APA

*To the Board of Editors, Council of Directors, and Members of the American Psychological Association:*

A meeting was held at 10:00 a.m., February 16, 1945, in the Psychology Seminar Room of the University of Pennsylvania at Philadelphia. Present were Alice I. Bryan, Bertha M. Luckey, Paul S. Lazarsfeld, Donald G. Marquis, W. L. Valentine, Business Manager of the APA publications, and John E. Anderson, *Chairman*. Absent were: Stuart H. Britt, and M. K. Brane. After discussing the organization, policies and purposes of an official journal and giving consideration to its relations to existing psychological publications, especially the *Psychological Bulletin* and the *Journal of Consulting Psychology*, the committee adopted as a procedure, first a description of the contents of



the proposed official journal and, second, a consideration of whether or not existing journals could be modified to meet this description.

The Committee passed the following votes:

1. That the official journal function as a professional journal for psychologists and as an organ for promoting the APA.
2. That the journal appear monthly and be distributed to all Members in accordance with the By-Laws.
3. That the journal include the following material and papers:
  - a. Proceedings of the APA including the reports of committees (when so ordered), reports of officers of the Association, and other papers of an official character.
  - b. Proceedings of any division, affiliated or regional, society with, if desired, abstracts of not more than 200 words each. The editor, with the approval of his board of cooperating editors may set regulations and space limitations for such proceedings. If a division wishes to publish its proceedings in a divisional or any other journal, it may publish a brief summary in the official journal.
  - c. Pre-meeting programs of the APA, the programs of the annual meetings of each division, regional and affiliated society, with abstracts, if desired, of not more than 200 words. It was suggested that a running calendar of announcements of all types of psychological meetings, and of the meetings of related societies in other fields appear regularly.
4. That, in general, the journal include articles and materials solicited by the editor, and that it contain both scientific content and professional material, with minimal overlapping of present psychological journals. It was the sense of the committee that the contents of the journal should be planned to cover the several fields of interest and areas of application of psychology, and that the editor should represent such fields and areas by appropriate headings and departments.

The following suggestions on content were made by the committee which recognized that the editor should have much freedom in developing the policies of the journal and in working out its layout and style.

#### A. *Scientific Content*

1. Presidential address (Lazarsfeld recorded as not favoring but preferring publication in *Bulletin*.)
2. Selected addresses of divisional chairmen
3. Editorial comment
4. Discussions of events bearing on psychology
5. Articles on trends in psychology

#### B. *Professional Content*

1. Relations with other professions, societies and sciences
2. Job descriptions of psychological positions
3. Articles on a professional level telling what psychology has done and is doing.
4. Areas of possible application of psychology
5. Psychology and the Public Service. (A continuation for public life of what has been done in the "Psychology and War" section of the *Psychological Bulletin*.)
6. Suggestions for cooperative projects
7. Teaching aids and materials
8. Opportunities for fellowships and internships

#### C. *News and Notes*

Much expanded over departments in present journals to cover more activities, more persons, and larger areas, and to include activities and material of an international char-



acter. Regional and divisional correspondents were suggested as a means of securing information.

#### D. Material from Central Office

A department such as the "Secretary's Desk" to contain running accounts on the affairs of the Association, and the accomplishments and goals of the Association.

#### E. Obituary Section

To contain brief factual obituaries of psychologists recently deceased.

#### F. Book Reviews

Pre-publication initialed or signed announcements with annotations of not more than 100 words for each book. These not to be abstracts or criticisms but to indicate areas of usefulness and the audience for which the book is intended. (Critical and evaluative reviews are reserved for other psychological publications.)

#### G. Communications

To include letters to the editor, within space limitations set by the editor, comments on the lay use of psychology, answers to questions of general interest coming in to the Association, and other relevant material.

#### H. Film Review Section

Articles at regular intervals summarizing and interpreting films of psychological interest to include not only those produced in university departments, but also films of interest to psychologists produced under commercial or other auspices. (Not to duplicate the abstracts of films now appearing in *Psychological Abstracts*.)

#### I. Section for Student Members of the Profession

To cover vocational opportunities, accounts of what students and student organizations are doing, and material accentuating the positive aspects of the profession and its accomplishments.

5. That the format of the journal differ from that of existing psychological publications in order to give it a distinctive character, that it be printed on smooth paper to facilitate the use of photographs and cuts, and that it be of a large page size, similar to *Psychological Abstracts*, in order to facilitate layout.

6. That the Business Manager take steps to prepare for the publication of the journal in January, 1946.

7. That the *Psychological Bulletin* resume its traditional function as a journal of long reviews, and that, if possible, it continue to be distributed to all members for at least a two-year period, drawing on capital, if necessary, in order not to break files, and that the question of the continuation of such distribution be surveyed after the two-year period.

8. That the problem of the disposition of the *Journal of Consulting Psychology* be referred to the Board of Editors of the AAP with the request that it make appropriate recommendations to the Committee on Publications and the Board of Directors of the reorganized APA at the September, 1945, meeting. It was suggested that the Board of Editors of the APA might well consider a possible area and function for this journal at its February, 1945, meeting.

9. That the Electoral Board of the APA be requested to nominate a slate of candidates for editor of the official journal and to determine their availability, prior to the September meeting.

10. That the central office employ a half-time managing editor to handle the editorial details of the official journal to function in somewhat the same manner as the Assistant Editor of the *Psychological Abstracts*, that this employee be located in the central office and be available for other duties in that office for the remainder of his time.



11. That the name of the journal be the *American Psychologist* with a subtitle *The Professional Journal of the American Psychological Association*.

The meeting adjourned at 4:00 p.m.

Respectfully submitted,  
ALICE I. BRYAN  
BERTHA M. LUCKEY  
PAUL S. LAZARSFELD  
DONALD G. MARQUIS  
JOHN E. ANDERSON, *Chairman*

## REPORT OF THE COMMITTEE ON STANDARDS FOR PSYCHOLOGICAL SERVICE CENTERS

*To the Council of Directors and Members of the American Psychological Association:*

The Committee has been rather inactive during the past year. The present report is therefore rendered primarily to indicate continued interest in the problems which come within its sphere. The major reason for inactivity is that, as indicated in our last year's report, the first and most important step for the Committee, viz., a survey of existing clinic facilities, did not seem an advisable undertaking during the rather unstable conditions of war. Plans are, however, under way for the preparation of a detailed questionnaire to be sent to the various clinics, covering the pertinent aspects of clinic activity. It is intended that this questionnaire shall be ready for distribution as soon as conditions in the field become sufficiently stabilized.

The data from the survey conducted by the Committee which preceded us has been deposited with us during the year and are available for use. In line with the Committee's recommendations of last year further contact has been established with the National Committee for Mental Hygiene's Clinic Division.

Respectfully submitted,  
J. W. CARTER  
N. FENTON  
D. B. LINDSLEY  
C. M. LOUTTIT  
M. SKODAK  
R. M. YERKES  
D. SHAKOW, *Chairman*

## REPORT OF THE COMMITTEE ON UTILIZATION IN PSYCHOLOGY OF SURPLUS WAR MATERIALS

*To the Council of Directors and Members of the American Psychological Association:*

The Committee on Utilization in Psychology of Surplus War Materials has held no physical meetings during the current year. All activities were carried on by means of correspondence between the chairman of the committee, the members of the committee and certain selected psychologists and governmental agencies.

Through the efforts of Dr. Donald G. Marquis and the Office of Psychological Personnel an arrangement was made with the Surplus War Property Administration to receive copies of the Surplus Reporter covering materials which might be of interest and value to psychologists. Inspection of a number of such listings of surplus war materials has revealed no materials which seem to be of particular interest to psychologists. It is the consensus of opinion of those who have given some thought to this question that there will be very little of interest to psychologists among the surplus property disposals until the war with Japan is much further along or concluded. Appreciable delays are



still to be experienced in the procurement of new electrical and electronic equipment of the types commonly employed in psychological apparatus even with high procurement priorities. With respect to the release of complete psychological apparatus of the type employed in the Aviation Psychology Program of the Army Air Forces, such release is not authorized and a method of release at some future date has not been formulated.

At the present time, the Surplus War Property Administration releases surplus property only to manufacturers or dealers after sealed bids have been opened. An individual cannot make use of the surplus property sales. Whether a university can purchase from the Surplus War Property Administration is now known. Interested psychologists should contact the purchasing agents in their universities to determine the medium for purchase of relevant equipment when such becomes available.

In view of the possible value of the committee it is recommended that the Committee on Utilization in Psychology of Surplus War Materials be continued. With the closing of projects and laboratories of military psychology it is probable that more equipment of specific interest to psychologists will be released and that a more liberal policy regarding the purchase of such equipment by individuals or institutions may be applied to such specialized research equipment.

Respectfully submitted,  
CHARLES W. BRAY  
PAUL M. FITTS  
CARROLL SHARTLE  
DONALD G. MARQUIS  
ARTHUR W. MELTON, *Chairman*

#### REPORT OF THE COMMITTEE ON DIVISION ORGANIZATION

*To the Council of Directors and Members of the American Psychological Association:*

This committee was instructed by vote at the annual meeting in September, 1944, to name a temporary chairman and secretary for each of the charter divisions proposed in Article 7 of the amended By-Laws. These appointments were made after nomination and vote by mail among the members of the Committee. The list of officers appears in the *Psychological Bulletin* for May, 1945, pp. 294-296.

These temporary officers assisted in preparing the ballots for membership nominations, so that the election of June, 1945 contained representative panels of nominees for the proposed divisions.

Because the Committee has taken care of the task for which it was created it should now be dismissed.

Respectfully submitted,  
HORACE B. ENGLISH  
ALVIN C. EURICH  
DAVID SHAKOW  
ROBERT M. YERKES  
ERNEST R. HILGARD, *Chairman*

#### REPORT OF THE COMMITTEE ON CLINICAL PSYCHOLOGY

*To the Council of Directors and Members of the American Psychological Association:*

The Committee on Clinical Psychology was appointed on January 27, 1945 by the presidents of the APA and AAP, as a joint committee of the two associations. This action was suggested by a committee of the American Psychiatric Association, recently formed to work toward a clearer and more satisfactory relationship between clinical psychologists and psychiatrists.



It is the purpose of the Associations' committee to cooperate with the committee of psychiatrists in the clarification of professional relations. First, a statement reflecting the views of clinical psychology is being prepared as a basis for discussion. Preliminary steps have shown that the major issue is inseparable from two others, the area and functions of clinical psychology, and the qualifications of a clinical psychologist. A later step will be a meeting with the psychiatric representatives, from which an agreement may arise. Even if complete accord is not reached, some progress may be expected from an objective and amicable discussion.

The committee has been unable to hold a physical meeting, but has corresponded extensively. The amount of correspondence is indicated by 86 communications sent or received by the chairman in less than six months.

Considerable progress has been made toward the preparation of the committee's statement. Each member first wrote an independent draft, which was circulated for the criticisms of the committee. A combined statement was then attempted by the chairman, and submitted to the committee for additional comments. The committee showed a high degree of agreement on the fundamental issues. A further revision of the statement has been sent to a panel of thirty representative leaders in applied psychology, from whom valuable suggestions are being received. From the work so far accomplished, it seems likely that a concept of clinical psychology can be formulated upon which most psychologists can agree. The committee feels that the statement should not be published at the present time, prior to discussion with the psychiatrists.

The committee has carried on certain other items of business. Statements in support of a bill before Congress, H.R. 2550, an act to establish a National Neuropsychiatric Institute, have been prepared by members of the committee. An inquiry concerning the number of psychologists required in mental hospitals has been referred to the committee.

The Committee regards this report as one of progress rather than of finished accomplishment. It recommends that the committee be continued, and that funds be appropriated to defray the traveling expenses of representatives of the committee to meet with those of the American Psychiatric Association.

Respectfully submitted,  
WILLIAM A. HUNT  
DONALD G. MARQUIS  
MARIE P. SKODAK  
FREDERICK C. THORNE  
LAURANCE F. SHAFFER, *Chairman*

#### REPORT OF THE COMMITTEE ON INTERNATIONAL PLANNING FOR PSYCHOLOGY

*To the Council of Directors and Members of the American Psychological Association:*

The Chairman attended the meeting in Washington of the Conference on International Relations on December 17, 1944. Valuable information was gained for the Committee in regard to the exchange of books and periodicals, the encouragement of the exchange of teachers and students and the equipment of foreign laboratories after the war.

The Chairman has written to English psychologists in regard to the next international Congress. Interest was expressed in having a congress as soon as feasible, but it was obviously felt that it would be several years after the war before one could be arranged. Letters have also been written to French and Italian psychologists.

The Chairman has heard from Professors Janet and Piéron, who are both again in Paris. Janet, at the age of 86, is writing a two-volume book on *Les Formes de la Croyance*. Piéron is working in his laboratory.



Dr. Jerome Bruner is at the OWI in Paris. When he was in America recently the Chairman talked over with him the possibility of arranging closer relations with the French psychologists. Through Mr. Donald S. Cameron, Chief of the Foreign Information Research Division, Outpost Service Bureau, Office of War Information, 224 West 57th Street, New York 19, the chairman has already been able to send by way of Dr. Bruner offprints and books to Piéron. In exchange Piéron has sent several numbers of *L'Anne Psychologique*. Bruner informed the Chairman that a French psychologist might be sent for a year to America, and asked for suggestions.

The State Department has enabled a Turkish psychologist to work at Princeton. It is hoped the exchange of teachers and students and research workers will be a permanent policy.

Through Professor Rufus Morey, who is head of the OWI in Italy, the Chairman is making direct contact with Italian psychologists. Professor Ponzo has written his appreciation of the renewal of correspondence and hopes for further exchange.

The Chairman has heard only indirectly about Michotte, who has been working in his laboratory at Louvain during the Occupation. The Chairman expects to get in direct communication with Michotte through Dr. Bruner in Paris.

It is hoped that we can get in touch with Russian psychologists.

It has been learned that the Documentation Library in Paris has a full backlog of the *Psychological Review*, *Psychological Abstracts* and *Psychological Bulletin*, together with reprints in psychology available to French scientists.

The work of the Committee is just beginning and it is recommended that it be continued.

Respectfully submitted,

WALTER S. HUNTER

WALTER R. MILES

ROBERT M. YERKES

HERBERT S. LANGFELD, *Chairman*

## REPORT OF THE REPRESENTATIVES TO THE COUNCIL OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

*To the Council of Directors and Members of the American Psychological Association:*

The American Association for the Advancement of Science is under the general direction of a Council which is comprised of the members of the Executive Committee, eight elected members, the vice-presidents and secretaries of sections, one fellow from Pacific and Southwestern Divisions and fellows from affiliated societies. Of the 258 present members, 52 were elected by the Council of the Association and 206 by the affiliated scientific societies and academies of science. Florence E. Goodenough is the vice-president and H. E. Burt is the secretary of the Section on Psychology (I). Two Members of APA, H. H. Remmers and D. A. Worcester, are Vice-president and Secretary respectively of the Section on Education (Q). Jean Macfarlane and Willard C. Olson represent the APA on the Council of the AAAS.

The Executive Committee now consists of A. J. Carlson, Chairman, Charles E. Kettering, President, F. R. Moulton, Permanent Secretary, Otis W. Caldwell, General Secretary, W. E. Wrather, Treasurer, and additional members elected by the Council. Walter Miles of the APA is on the Committee.

Membership in the Association is open to all persons engaged in scientific work. The dues are \$5.00 per year. As of February 12, 1945, in a total membership of 26,872, 1,335 gave Section I, Psychology, as a first choice, and 2,040 mentioned it as either a first or second choice. Each year the Secretary of the American Psychological Association sends a list of names and addresses of new Associates to the office of the Permanent Secretary in order that invitations and literature may be issued. Members who have



made substantial contributions to the advancement of science are eligible for election as Fellows. Each year the Committee for Section I makes such nominations. Associates of the APA who transfer to Member have often been nominated for Fellow in the AAAS shortly thereafter.

The last large meeting of the Association was held in Philadelphia from December 27, 1940, to January 2, 1941. Since that time plans have been altered in terms of regulations on transportation. A small meeting in which the American Psychological Association participated was held in Cleveland in September of 1945. Willard C. Olson attended meetings of the Council and of the Committee for Section 1. On June 24, 1945 the executive committee voted that no general meeting of the Association should be held during the current calendar year. Victory in Europe, the surrender of Japan, and the progressive relaxation of transportation restrictions will, no doubt, permit resumption of meetings in the near future.

In January 1945 the Permanent Secretary sent an inquiry to the secretaries of sections and of affiliated societies to determine what part of the year will be best for annual meetings in the future. In recent years the annual meetings have been held between Christmas and New Year's, but in earlier years meetings were held in various times, mostly in the summer months. To get an inkling concerning possible future policies the Council of Directors of the APA was circulated on the question of whether or not the American Psychological Association will wish to hold its Annual Meeting simultaneously with that of the AAAS. Seven replied no, one replied yes, and one replied occasionally. In response to a question concerning the most suitable season for meetings of the AAAS, the fall was easily the first choice, spring and summer were tied, and the winter followed shortly thereafter in the ranking.

During the war an increased use has been made of the mails in enlisting the participation of Council Members in the affairs of the Association. Meetings of secretaries of sections and of affiliated societies have been held in the middle west and in the east for participation in planning and similar meetings are contemplated for the future.

The AAAS publishes the *Scientific Monthly* and *Science* and Members may choose one to receive with their dues. The Association is taking over the editorship of *Science* beginning January 1, 1946. Walter R. Miles is on the policy committee for the journal. In July, 1945, a ballot was circulated to the Council of the AAAS to secure editorial advisors. The function of the new Editorial Board is to serve as an advisory group to the Editor or Editors in the stimulation and appraisal of manuscripts for publication. Robert H. Seashore, with a term expiring December 31, 1949, was elected to represent Section I, and Willard C. Olson, with a term expiring December 31, 1947, was elected to represent Section Q. The APA has been invited to cooperate in preparing articles for the general reader for the section *Science* on the March in the *Scientific Monthly*. The AAAS Bulletin which is sent to members is devoted to the affairs of the Association.

The APA has cooperated with Section I in most years by printing a preliminary announcement and call for papers on lightweight paper and including it in the mailing of the notice of dues to Associates and Members. It may be advisable to resume this practice in the future when meetings are in order.

For more than 25 years the Smithsonian Institution has generously provided office space for the Association free of charge. The pressure for space has become so great on both institutions that it is necessary for the Association to provide its own home. A prospectus has been prepared sketching the history and future possibilities of the Association and members and friends will soon be asked to make donations toward the construction or purchase of a building to be located in Washington.

Respectfully submitted,  
JEAN MACFARLANE  
WILLARD C. OLSON



# REPORT OF THE REPRESENTATIVE OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION ON THE AMERICAN DOCUMENTATION INSTITUTE

*To the Council of Directors and Members of the American Psychological Association:*

During 1944 the American Documentation Institute, 1719 "N" St. N.W., Washington, D. C., conducted several essential services to the scholarly and scientific fields: continuing its auxiliary publication service; providing sets of journals in microfilm; cooperating with the U. S. Department of Agriculture in supplying equipment for operating Bibliofilm Service, and the Oriental Science Literature Service. With the cooperation of the Alien Property Custodian, another activity has also been established—the Technical Translations Clearinghouse. In effect, this has become a part of the auxiliary publication service, and makes available translations that previously were inaccessible.

The activities of the American Documentation Institute have continued to be operated upon a minimum basis with a part-time of voluntary staff, and as a consequence, the financial resources are slightly greater than last year.

There is in preparation the issuance of a list of deposited documents and translations; this list should acquaint more people with the possibilities of the utilization of the auxiliary publication service technique and the usefulness of such a method of publication particularly under wartime conditions. With the present limitation of publication in the scholarly and scientific fields it is likely that this technique, demonstrated over a considerable number of years and utilized by a large number of journals, can be of major service in assuring the publication by this method of all material that should be circulated, no matter how detailed and voluminous.

Shortly after the formation of the American Documentation Institute it was suggested that "technically it should be possible to place on a 3×5 card of film 200 images of an ordinary book-size page. This would mean that it would be technically possible for the libraries of the future to occupy the space of their present card catalogs." In this connection the ADI is now considering the further technical improvement of microfilm as a documentation tool.

Respectfully submitted,  
STUART HENDERSON BRITT

## REPORT OF THE DELEGATES TO THE INTER-SOCIETY COLOR COUNCIL

*To the Council of Directors and Members of the American Psychological Association:*

In accordance with regulations of the War Committee on Conventions, it was necessary to cancel plans for the ISCC 14th annual meeting which had been scheduled for February 1945. This did not preclude meetings of the Executive Committee.

One of the most important pieces of work completed by the Executive Committee this year was a statement concerning the organization and functions of the Color Council. In order that this statement would be brought to the attention of all delegates and members of the ISCC and to any member of a member body who is interested, the report has been printed for distribution. With it appear also the Council's Articles of Organization and Procedure, a list of ISCC Problems, 1931-45, a list of published reports 1931-45, and a list of member bodies 1945. Copies have been mailed to delegates and members.

The News Letter of the ISCC has continued its important function by means of some 83 pages of color news, reviews and bibliography in the course of the year. A new policy of distribution has been adopted so that subscriptions are now authorized at the rate of three dollars per year. This is in addition to the circulation without charge to all delegates and members.

Work on several comparative studies on illuminations in relation to textile color-matching problems has developed into a major project. On October 6, 1945 Mr. W. D.



Appel, President of the American Association of Textile Chemists and Colorists, in a letter to Professor Zigler, Chairman of the Council, proposed that the project be set up as an Inter-Society Color Council Problem. This was done at a meeting of the Council Executive Committee on October 19. The group already working on the problem has been appointed as a sub-committee of the Problems Committee to study and report on Problem No. 13, *A Study of the Illuminant in Textile Color Matching*.

Work on Problem No. 10, *The Color Aptitude Test*, under the co-chairmanship of Forrest L. Dimmick and Carl E. Foss, has shown considerable progress. Experimental form 1944, has been produced and some 30 sets have been sold. Tentative norms were issued with the sets and new norms based on results obtained in the past six months are in preparation.

Problem 11, *Studies of Color Blindness*, has progressed in three directions, viz.: publication of results, development of new tests and cooperative work by the whole committee comparing statistically the results of two or more tests given to the same group of subjects.

Committee work of the types cited is being carried on in spite of the curtailment necessitated by war conditions. In all of the Council's work delegates of the APA are taking an appropriate part. Professor M. J. Zigler is serving the second year of his term as Chairman of the Council. Other delegates are serving on the various active committees or are carrying on cooperative work for the Council.

Plans have been inaugurated for a 1946 meeting of the Council in the hope that transportation conditions will improve sufficiently to permit holding it.

Your delegation recommends that the American Psychological Association continue its affiliation with the Inter-Society Color Council and that the present delegation be re-elected.

Respectfully submitted,

SIDNEY M. NEWHALL, *Voting Delegate*

MICHAEL J. ZIGLER, *Voting Delegate*

FRANK A. GELDARD

JOY P. GUILFORD

HARRY HELSON

THEODORE F. KARWOSKI

ELSIE MURRAY

LOUISE L. SLOAN

A. RAINS WALLACE

FORREST LEE DIMMICK, *Chairman*

## REPORT OF THE REPRESENTATIVE TO THE DIVISION OF PERSONNEL OF THE NATIONAL COMMITTEE FOR MENTAL HYGIENE

*To the Council of Directors and Members of the American Psychological Association:*

The Division of Personnel is oriented toward serving and expanding the field of mental hygiene in as efficient and effective manner as possible. During the past year the Division has concerned itself with the study of the needs of mental hygiene clinics, personnel and training opportunities both during the war and under postwar conditions.

Some of the opportunities for full-time employment of clinical psychologists at this time are in the Veterans Administration. That organization needs psychologists, 1) in its vocational rehabilitation work, administering the projects of Public Law 16; 2) in hospitals, especially neuropsychiatric and hospitals for amputees and other seriously handicapped veterans; 3) in out-patient clinics which have been little developed in the past, but more of which are planned.

A second possibility for employment may be in the veterans guidance centers which



have been established in sixty-three educational institutions throughout the country, under contractual relationship with the veterans administration. The educational institutions in these centers would actually do the employing, if additional staff were needed. In these centers men pursuing higher education or taking special training under the provisions of Public Law 16 are tested as to intelligence and vocational aptitude, and and counseling is done to work out educational and vocational objectives. Men pursuing education under the G.I. Bill of Rights (Public Law 346) may use these centers, but are not obliged to do so.

What is badly needed throughout the country is more psychiatric out-patient clinics conducted under private and public auspices which will serve veterans. At the present time there are very few of these clinics beyond a part-time and volunteer basis (with the exception of Chicago, San Francisco and Los Angeles). The New York Hospital runs a rehabilitation clinic one night a week but can accommodate only about forty veterans. Now that the war is over, many communities (such as Westchester) are going ahead with plans for mental hygiene and child guidance clinics, plans which were held up because of concentration on the war effort. Increased interest in ways of effectively curbing juvenile delinquency has given impetus to the setting up of guidance centers and of establishing or adding to psychological staffs in corrective and social welfare institutions.

During the past year the supply of workers to fill positions in clinical psychology has been limited. And when available, psychologists did not seem to be sufficiently well trained in the clinical field to maintain the high standards essential to the profession. With release from the armed forces many psychologists whose only experience and training have been in these armed forces will be seeking clinical positions. In view of these facts it seems essential that a needed field of expansion is in providing more adequate training centers for psychologists. During the past twenty-five years standards for the training of psychiatrists have been raised very markedly. But standards for the training of clinical psychologists are only beginning to move upward (exceptions are in the training centers at Worcester State Hospital and in the New York State Intern Training Program). The Menninger Clinic is now just starting a center with excellent training opportunities). The conferring of an M.A. degree along with one course in psychometrics has too long been the badge of a clinical psychologist. Fortunately universities as well as mental hygiene clinics are realizing more and more the need for at least a year's internship in the clinical field before a young psychologist is ready to work in practice outside academic portals.

We now come to the more concrete work of the Division. For the period July 1, 1944, to July 1, 1945, one hundred and two students and qualified psychologists sought advice and aid in training and placement. Twenty-three clinics and hospitals requested help in finding psychological personnel. The former figure does not include the number of persons who inquired concerning other psychological openings in industry, personnel, teaching and the like. The majority of the psychologists desiring employment was interested in work in the rehabilitation of veterans.

Student counselling services in the colleges and universities have written for information concerning training and opportunities for their graduates for work in the mental hygiene and related field. Since the report "Standards of Training of Professional Personnel in Psychiatric Clinics" is out of print and it will not be revised and reprinted for the present, at least, the Division has had copies of the sections pertaining to the requirements for psychologists, and the other professional groups, mimeographed for distribution.

Through the field staff of the Division on Community Clinics of the National Committee for Mental Hygiene, the Division of Personnel is in a strategic position to learn



of opportunities in psychological placement and to advise concerning the standards and facilities of clinical services throughout the country. But the National Committee for Mental Hygiene does not have the complete facilities of a placement service. Consequently if the Division of Personnel is to give efficient assistance in order to meet the demands of the postwar period, it is recommended that as soon as funds can be made available, additional staff be engaged. In this way employers of clinical psychologists and applicants for clinical positions in psychology can be handled in an individualized and qualitative manner rather than by impersonal and punch card methods.

Respectfully submitted,  
THEODORA M. ABEL

## REPORT OF THE ANNUAL MEETING OF THE NATIONAL COUNCIL ON REHABILITATION

*To the Council of Directors and Members of the American Psychological Association:*

Your representative attended the meetings of the National Council on Rehabilitation and participated in the discussion of the report of the Committee on the Process of Rehabilitation. The report has been revised and is a great improvement over the one presented last year as far as the function of the psychologist is concerned. The committee was instructed by the Council to make further revisions and it is hoped that on the basis of verbal suggestions as well as printed matter supplied to the committee an even clearer picture of the psychologist's role in the rehabilitation process will be presented in the next report prepared by the committee.

It seems desirable for the APA to continue its affiliation with the national Council on Rehabilitation since the organization seems to be doing an excellent job and is serving a very useful purpose.

Your representative was elected to the Nominating Committee for the coming year.

Respectfully submitted,  
LOUIS LONG

## REPORT OF THE CHAIRMAN OF THE DIVISION OF ANTHROPOLOGY AND PSYCHOLOGY OF THE NATIONAL RESEARCH COUNCIL

*To the Council of Directors and Members of the American Psychological Association:*

Because the work of the National Research Council in the fields of anthropology and psychology deals so largely with selection and training of personnel, it has closely followed the various phases of national mobilization. During the year just ending, the work of the Division as reported last year has continued with certain shifts in emphasis. Victory in Europe produced fewer personnel changes in psychologists concerned with war research than might have been anticipated. There is still, in fact, a real deficit of men trained in certain special fields essential in war research.

There has been much discussion during recent months of the form which the national organization of scientific research is to take after the war is over. A new Research Board for National Security has been established which is closely related to the National Academy of Sciences and hence, indirectly, to the National Research Council. It is fortunate for the science of psychology that Dr. Walter S. Hunter, a former Chairman of the Division and present Chief of the Applied Psychology Panel of the National Defense Research Committee, has been made a member of the Research Board and, as such, will officially represent psychology in its deliberations.

It is necessary to remember that Dr. Ross G. Harrison, Chairman of the National Research Council, and the other administrative officers of the National Academy of Sciences and of the Research Council work in close liaison with corresponding officials in



the Social Science Research Council and the American Council of Learned Societies. It is obviously proper that there should be no unnecessary confusion of function between the work of the National Research Council and that of the other Councils. He has been clear during the war period that some of the projects requiring the skill of professional psychologists have been essentially in the field of the Social Science Research Council, whereas many other projects have concerned themselves with aspects of psychology which lie clearly in the realm of the National Research Council. It is a strength rather than a weakness of psychology that it has this double representation. Practically, however, the more one is forced to deal with the question of what is social science and what is not social science in concrete administrative situations rather than in theoretical terms, the more difficult the problem becomes. Almost every psychological problem involving the activities of groups of individuals or the evaluation of the capacities of individuals in relation to other individuals may properly be referred back to the characteristics of the individual himself. The decision as to whether a problem is essentially in the social science field or not thus often becomes a question merely of emphasis.

A brief summary of the work of the psychological Committees of the Division follows:

As was the case last year, the work of the Committee on Applied Psychology and the War, Mr. John M. Stalnaker, Chairman, cannot be reported upon. It has continued in the support of preliminary investigations of problems of immediate interest to the Services, this support being derived from funds provided under a contract between the Office of Scientific Research and Development and the National Academy of Sciences.

The Committee on Child Development, under the chairmanship of Dr. R. S. Woodworth, met in New York City on February 25 and 26, 1945, at which time a broad program was formulated. This program involves the possible appointment of a full-time Executive Secretary, to be located in Washington, who would act as liaison officer for the Committee with various welfare agencies and sources of support for research in the field of child development. In partial fulfillment of the recommendations of the Committee there has recently been appointed a Subcommittee on Finance, which will attempt to secure funds for implementing not only the Committee program in general but also a Subcommittee on Adolescence, which will presumably be appointed at the opportune time for the purpose of participating in the welfare of youth after the war. The personnel of the Committee has been changed to some extent by the addition of a representative from the field of medical research and one from dental research, and a scheme of gradually changing the membership of the Committee has been worked out in detail. At this meeting the Committee also recommended the establishment of a central committee to deal with the problem of translating scientific findings into living habits—a problem in which the Committee on Food Habits is very much interested at the present time. It is anticipated that at some time in the future a conference will be held for the purpose of investigating the possibilities of publishing a series of articles embodying a concrete analysis and evaluation of methodology in the field of child development.

During the past year the Committee on Classification of Military Personnel Advisory to the Adjutant General, under the chairmanship of Dr. W. V. Bingham, has continued its valuable work with a certain change of emphasis. For example, two of the problems which have assumed importance are the measurement of proficiency of enlisted men and officers, and reconditioning and convalescent training. Because of the increasing number of psychoneurotic convalescents and the need for adequate care of these soldiers, The Surgeon General and The Adjutant General have collaborated in a program of procurement and training of clinical psychologist officers and their assignment to work with psychiatrist officers in mental hygiene clinics, convalescent training hospitals, and neuro-psychiatric wards. A Subcommittee of the Committee on Classification of Military Personnel known as the Advisory Board on Clinical Psychology was appointed to assist in



this program of selection and training of officers. Other Committee recommendations during the year have included: a new battery of induction station tests, a new Army General Classification Test, a simplified individual test of mental ability to be used in cases where a group test would not be feasible, and a screening test of officer candidates.

During the past year the Emergency Committee in Psychology, under the chairmanship of Major Karl M. Dallenbach, has held but two meetings but has kept in close touch with the activities of groups in the Services, coordinate committees, government agencies, and projects which it has stimulated. At the request of Dr. H. E. Burt, Chairman, the Subcommittee on Psychological Aspects of Readjustment was discharged in December, 1944. A special committee on Refresher Courses for Returning Psychologists was appointed under the chairmanship of Dr. Harry Helson as a result of a proposal submitted at the 1944 Annual Meeting of the Division by Dr. Gordon Allport, with the purpose of discovering the demand for such courses and of bringing to the attention of those desiring to take refresher courses lists of special courses offered by universities over the country. The Subcommittee on a Textbook in Military Psychology has completed its original and major project, a text entitled *Psychology for the Armed Services*. Sales of *Psychology for the Fighting Man* and *Psychology for the Returning Serviceman* have continued to be large, and the royalties which have accrued to the Division from the sale of these two volumes are considerable. The Subcommittee on Survey and Planning has continued to deliberate on problems referred to it by the Emergency Committee and to formulate new problems for consideration by the parent Committee. Other projects of the Emergency Committee during the year have included: preparation of a memorandum concerning the place of psychology in a full rehabilitation program, which was submitted to the National Council on Rehabilitation for its consideration; an unsuccessful attempt to have Engineer, Science, and Management War Training courses opened to individuals in government service; a small conference held at The Training School, Vineland, New Jersey, on professional preparation; and recommendation to the Social Science Research Council that a Committee on Interpersonal Hostility be formed within that organization.

Because of the shift in problems dealt with by this Committee from emergency to professional and postwar problems, it has been deemed desirable that the Committee and its then existing Subcommittees be discharged as of December 31, 1945.

As a result of many conferences held with representatives of the Services, government agencies, and Consultants, the Committee on History of Psychology and the War, under the chairmanship of Dr. R. M. Yerkes, has completed its preparatory work and is awaiting receipt of materials. In the meantime, the members are considering appropriate ways of organizing and presenting the materials to be submitted.

Chairman H. S. Langfeld, of the Committee on International Cooperation in Psychology, has been corresponding with English psychologists with regard to the next International Congress, but it is probable that arrangements cannot be made for holding a Congress until several years after the conclusion of the war. Drs. Janet and Piéron have been heard from, and through the good offices of the Office of War Information books and reprints have been sent to Dr. Piéron in Paris. Subsequent to a recommendation made at the Annual Meeting of the Division, this Committee was made a joint committee with the Division of Foreign Relations of the National Research Council.

Dr. Irvin L. Child has been appointed Chairman of the Committee on Latin-American Psychology upon recommendation of the former Chairman, Dr. J. G. Beebe-Center. Although no physical meetings have been held, the Committee has continued with the reviewing and abstracting of Latin-American psychological literature and assisting in the exchange of information on periodicals between the two continents. No progress has been reported on the encouragement of social-psychological field work in



Latin America by United States psychologist. It is hoped that in the matter of intercultural relations this Committee may collaborate with the Committee on International Cooperation in Psychology.

Upon recommendation of the Emergency Committee in Psychology there was established in the Division a Committee on Release of Psychological Tests, Dr. C. L. Shartle acting as Chairman. In the original recommendation upon which this Committee was organized, it was intended that the Committee should recommend to the National Research Council the copyrighting of psychological tests and personnel procedures, the patenting of testing apparatus, and the assignment of copyrights or patents to reputable concerns for manufacture and distribution, these copyrighted tests to be made available without payment of royalties to any department of the Federal Government. This problem has not yet been finally settled.

The Committee on Selection and Training of Aircraft Pilots, under the chairmanship of Dr. Morris S. Viteles, has continued to be one of the most active Committees of the Division. Upon completion of five years of research under contract with the Civil Aeronautics Administration the Chairman has prepared a report entitled *The Aircraft Pilot: 5 Years of Research—A Summary of Outcomes*, which appears as Report No. 46 in the Technical Series. The major development of the past year has been the establishment of a second Institute of Aviation Psychology at Ohio State University. At this Institute preparations are under way for the initiation of a study on the relationship between visual measures and flight performance, which is being undertaken at the request of the Civil Aeronautics Administration. The past year has also seen the establishment of close liaison with such medical groups as the Aero Medical Association, the School of Aviation Medicine, and the Committee on Medical Problems in Civil Aviation of the National Research Council.

The Office of Psychological Personnel, under the direction of Dr. Donald G. Marquis, has during the year, in addition to its routine office functions, assisted in furnishing information on psychologists qualified to obtain commissions in the clinical psychology program and in helping inductees to be assigned to psychological duties; has cooperated with various departments of the Government in producing information about vocational opportunities in psychology; and has, through its Consultants, prepared three questionnaires for survey purposes: (1) a questionnaire for surveying psychologists in the military services, devised by Lt. S. H. Britt; (2) a questionnaire on contract clinics being set up between the Veterans' Administration and various educational institutions, prepared by Lt. (jg) John G. Darley; and (3) a questionnaire intended for graduate departments of universities on existing facilities and postwar plans for graduate training in psychology. It has been recommended that this Office be discontinued as of December 31, 1945, its records being transferred to the Central Office of the American Psychological Association.

Respectfully submitted,  
LEONARD CARMICHAEL, *Chairman*

## REPORT OF THE REPRESENTATIVE TO THE SOCIAL SCIENCE RESEARCH COUNCIL

*To the Council of Directors and Members of the American Psychological Association:*

The Social Science Research Council holds two meetings per year which are attended by your representatives. These meetings are devoted to discussions of general policy and to reports of standing committees of which the most important is the Committee on Problems and Policy under the current chairmanship of A. T. Poffenberger. The Council is not organized on the basis of the fields represented as is the case in the National Research Council. It is rather a unitary organization seeking to advance social science in general rather than the social science in particular.



During the past year the Council's attention has been directed primarily to problems of reorganization including the election of Dr. Donald Young as executive director to replace Dr. Robert T. Crane, retired. Some steps are being taken with reference to possible post-war governmental subsidies to research in the social sciences. The Committee on Social Adjustment is concerning itself with problems of attitude and opinion measurement and with the broad field of rehabilitation. A problem on interpersonal hostility and conflict was transmitted to the Council by the Emergency Committee in Psychology, NRC, and a committee to consider the problem was established.

Respectfully submitted,  
WALTER S. HUNTER

## REPORT OF THE TREASURER AND BUSINESS MANAGER OF PUBLICATIONS

*To the Council of Directors and Members of the American Psychological Association:*

I am transmitting herewith the annual financial report on the operations of the Association.

This report, audited by professional accountants, shows the financial condition of the Association as of December 31, 1944.

The auditor's report is a detailed one which is appended to this summary. It concerns itself principally with an accounting for the cash received and disbursed during the year according to divisions of operation, a verification of the bank balance, an examination of the securities, and an estimate of the liabilities. This process results in the *balance sheet* and a statement of *net worth*.

*Overall Condition.* The financial operations for the year resulted in a surplus of \$24,847.99. The year 1944 was, thus, the best year the Association has had. In some measure this reflects the current financial condition of the members. Dues were paid in greater proportion to total membership than ever before, private libraries were restocked, while schools bought sets that they never before had owned. In all, the sale of back numbers amounted to roughly \$6,300, or about twice what was expected. At the same time that income was higher, costs were down in practically every category. (See Exhibit A). especially important is the reduction in net cost of the Office of Psychological Personnel.

Over a period of years the costs for abstractors and translators fell, due to wartime conditions principally; there were no expenses for annual meetings, no programs to be printed, etc. Rigid economies in printing reduced these costs, although more subscribers were served than ever before in the history of the Association. In 1944, the growth of the publications business has reached a level some 50 per cent greater than 1938.

Many associations which tie dues and subscriptions together have been unable to supply recently acquired members with printed material. In our case, however, we have been able to furnish approximately the same amount of reading material, although we have crowded words on the individual pages.

*Assessment.* In 1944, the War Service Assessment was continued. During the year, \$7,330.41 came into this fund while the expenses were \$6,924.10. Since we were prepared to underwrite the program of the Office of Psychological Personnel to the extent of \$10,000, this is a real saving. Since its beginning, the Office has cost the Association \$7,637.84 in excess of the assessments collected; these collections were \$13,124.73 as of December 31, 1944.

*Office of Psychological Personnel.* As in 1943, in 1944 we set up an account to maintain the Office of Psychological Personnel. Payments were made to the NRC in quarterly installments. Unforeseen economies were practiced under Donald Marquis, so that this account shows a surplus, whereas a deficit was expected. Fiscal details are given in the Report of the Office of Psychological Personnel, but we can easily see the related activities of the Treasurer's Office in the following tabulation:



Contribution to NRC	\$10,000.00		\$10,000.00
Collection of Assessment		\$ 7,330.41	
Refund from NRC		3,075.90	
		<hr/>	
		\$10,406.31	
Net gain to APA			\$ 406.31
In 1943, net cost had been		\$ 3,172.79	
In 1942, net cost had been		4,971.36	
		<hr/>	
Less surplus, 1944		\$ 8,144.15	
		406.31	
		<hr/>	
Net cost since beginning of operation		\$ 7,637.84	

*Investments.* The growing surpluses have enabled the investment committee to put more and more dollars into war bonds. At the same time, falling interest rates have cut the income from investments. In 1938, an investment of \$36,375.22 brought \$1,139.72, while in 1944, \$52,802.50 brought only \$1,489.23 into current income. This is a slight increase over \$1,373.83 in 1943.

## EXHIBIT A

## Summary of Income and Expense, 1938-44

## INCOME

	1944	1943	1941	1938
Dues				
Members.....				
Associate.....	\$ 5,270.50	\$ 4,453.18	\$ 3,660.08	\$ 3,488.25
Subscriptions	6,371.21	5,301.82	2,892.85	2,758.75
Members & Assoc.....				
Spec. Comb.....	14,044.35	9,972.80	12,854.66	11,242.50
Others.....	9,325.34	6,920.00	5,389.00	—
Reprints.....	25,457.09	21,173.76	17,768.75	17,375.29
Back Numbers.....	3,818.03	2,955.97	3,315.18	3,864.09
Collections from authors.....	6,317.59	3,733.07	2,805.57	1,849.33
Interest on Savings Accounts.....	2,125.55	1,176.52	3,135.06	771.51
Interest on Bonds.....	406.23	449.37	702.78	627.66
Advertising.....	1,083.00	958.00	178.65	512.06
Miscellaneous.....	559.50	568.83	481.68	575.80
	400.34	305.98	646.49	1,221.18
TOTALS.....	\$75,178.73	\$57,969.30	\$53,902.06	\$44,286.42

## EXPENSE

	1944	1943	1941	1938
Printing Costs.....	\$30,884.29	\$31,274.93	\$26,303.88	\$23,145.36
Allowance to Officers and Editors.....	6,612.00	6,957.84	5,564.13	6,175.00
Compensation to Employees.....	5,920.14	5,539.64	5,074.77	3,608.53
Committee Expense.....	786.37	245.86	312.59	265.95
Net Cost, O.P.P.....	406.31*	3,172.79	4,971.36	—
Reprints.....	2,379.92	3,364.45	2,775.24	3,313.37
Abstractors & Translators.....	332.23	445.40	716.75	1,570.34
Yearbook.....	1,137.73	931.87	1,060.20	915.62
Office Supplies.....	1,656.82	2,017.72	1,327.99	1,352.70
Payments to Authors.....	162.34	99.00	650.00	522.28
Professional Services.....	352.90	504.50	412.50	375.00
Provision for Doubtful Accounts.....	545.37	943.31	27.11	72.77
Annual Meeting.....	—	36.57	466.62	516.00
Miscellaneous.....	1,057.68	1,356.18	966.05	492.56
TOTALS.....	\$50,330.74	\$56,890.06	\$45,658.65	\$42,253.31
Treasurer's Office.....	\$ 5,619.14	\$ 8,147.88	\$ 6,126.42	\$ 5,771.22
Membership.....	3,806	3,476	2,937	—
Publications, Total Units.....	170,500	157,849	116,399	—

\* A surplus.



*Psychological Bulletin.* The *Bulletin* ended the year with a surplus of \$354.66. In the preceding year only 50 cents from each person's dues were put into the *Bulletin* account so that it ended 1943 with a rather serious deficit. The costs of production are such that the ten numbers of the *Bulletin* cannot be supplied to members for much less than a dollar from each one. We have previously planned to get these production costs down to a point where 75 cents from each person would be sufficient. This does not appear possible in view of prevailing printing costs. (See Exhibit B.)

*Psychological Abstracts.* In 1943, the amount of dues allotted to the *Abstracts* was fixed at \$3.00. This provided a sufficient sum to barely maintain the publication and was a step taken in view of expenses anticipated in the O.P.P. The same amount was transferred to this account in 1944, but this year we show a comfortable balance of \$5,407.30. The reduction in expense shown by the Editorial Office account is the temporary wartime result of lack of material to be abstracted. This picture will change and we can look forward to a sharp increase in the expenses of this office following the war.

## EXHIBIT B

*Psychological Bulletin*

	INCOME			
	1944	1943	1941	1938
Members and Associates.....	\$2,813.85	\$1,404.80	\$2,030.90	\$1,339.50
Library Subscriptions.....	3,743.64	3,006.54	2,986.45	1,608.53
Other Income.....	2,258.35	1,316.81	2,960.74	1,354.23
Total Income.....	\$8,715.84	\$5,728.15	\$7,978.09	\$4,302.26
	EXPENSE			
	1944	1943	1941	1938
Printing.....	\$5,597.59	\$4,877.98	\$5,201.75	\$2,744.72
Other Expense.....	2,763.59	2,658.57	2,296.60	1,199.03
Total Expense.....	\$8,361.18	\$7,536.55	\$7,498.35	\$3,943.75
Circulation.....	4,030	3,474	3,201	624

The Business Office expenses can also be expected to increase as circulation becomes greater. The reduction in printing costs shown here does not mean a reduction in *rate*; it is consequent on the smaller editorial content and crowding of material on the pages, a measure designed to save paper. (See Exhibit C.)

## EXHIBIT C

*Psychological Abstracts*

	INCOME			
	1944	1943	1941	1938
Members and Associates.....	\$11,230.50	\$ 8,568.00	\$10,823.76	\$ 9,903.00
Library Subscriptions.....	4,841.70	3,672.18	3,937.46	3,152.95
Other Income.....	1,466.62	1,512.18	1,420.26	1,062.47
Total Income.....	\$17,538.82	\$13,752.36	\$16,181.48	\$14,118.42
	EXPENSE			
	1944	1943	1941	1938
Printing.....	\$ 5,748.07	\$ 6,178.54	\$ 6,438.38	\$ 7,069.25
Editorial Office.....	4,805.04	5,454.11	5,690.29	6,703.08
Business Office.....	1,578.41	2,325.68	1,704.63	1,000.10
Total Expense.....	\$12,131.52	\$13,958.33	\$13,833.30	\$14,772.43
Circulation.....	4,095	3,649	3,338	2,701

*Journal of Abnormal and Social Psychology.* The *Journal of Abnormal* continues to enjoy a substantial financial success. The financial picture of this journal is different from the others in the sense that, under the terms of the gift by which it was acquired, whatever surplus obtains must be used in the exclusive interests of this journal. On a previous occasion (1943) a special clinical number was provided as a gift to the sub-



scribers. In every respect this number was an extra issue rather than a supplement, and in view of the paper shortage, was an operation which could not be accomplished in 1944 or 1945. The reserve, after the addition of the surplus for the year, stands at \$6,683.91. (See Exhibit D.)

## EXHIBIT D

*Journal of Abnormal and Social Psychology*

	INCOME			
	1944	1943	1941	1938
Library Subscriptions.....	\$3,797.29	\$2,875.16	\$2,909.30	\$2,729.34
Clubs.....	1,246.05	923.00	711.56	—
Other Income.....	1,326.35	773.20	784.68	837.94
Total Income.....	\$6,369.69	\$4,608.74	\$4,405.54	\$3,567.28
	EXPENSE			
	1944	1943	1941	1938
Printing.....	\$3,216.00	\$4,099.23*	\$2,524.89	\$2,340.41
Other Expense.....	1,342.38	1,474.36	855.82	1,077.91
Total Expense.....	\$4,558.38	\$5,573.59	\$3,380.71	\$3,418.22
Net Income.....	\$2,011.31	\$1,002.23†	\$1,024.83	\$148.96
Reserve.....	\$6,683.91	\$4,672.60	\$4,911.75	\$2,580.15
Circulation.....	1,953	1,569	1,158	607

\* Includes clinical number.

† Deficit.

*Psychological Review.* During 1944, the *Review* adopted a double column, permitting the use of a somewhat smaller type size without interfering with legibility, and decreased the margins appreciably so that about 25 per cent more characters appear on each page. This means a paper saving of 25 per cent, as well as economies in press work. The cost of composition per page is larger because composition costs are proportional to the number of characters cast, regardless of size. In common with the other journals, the library subscriptions increased during the year. Details for selected years are shown in Exhibit E.

## EXHIBIT E

*Psychological Review*

	INCOME			
	1944	1943	1941	1938
Library Subscriptions.....	\$3,536.25	\$2,513.96	\$3,166.76	\$3,521.82
Club Subscriptions.....	1,247.00	922.25	794.88	—
Other Income.....	1,168.98	642.58	775.03	646.77
Total Income.....	\$5,952.23	\$4,078.79	\$4,736.67	\$4,168.59
	EXPENSE			
	1944	1943	1941	1938
Printing.....	\$2,916.68	\$3,746.82*	\$2,604.71	\$2,406.80
Other Expense.....	1,121.32	1,218.58	1,128.16	1,028.67
Total Expense.....	\$4,038.00	\$4,965.40	\$3,732.87	\$3,435.47
Circulation.....	1,883	1,543	1,132	808

\* Includes Jubilee Number.

*Journal of Experimental Psychology.* In view of the paucity of manuscripts, this journal appeared in only one volume of six issues in 1944, instead of the former two volumes of six issues each. Although the details of income and expense show sharp changes, nevertheless the balance of total income over expense is more favorable than it has ever been.

It was felt that no further crowding of the page could be accomplished for this journal in view of changes of format made in 1941 in an effort to reduce costs. (See Exhibit F.)



## EXHIBIT F

*Journal of Experimental Psychology*

	INCOME			
	1944	1943	1941	1938
Library Subscriptions.....	\$3,004.27	\$4,215.87	\$3,635.37	\$4,887.78
Club Subscriptions.....	1,868.06	2,771.00	2,999.36	
Other Income.....	1,927.60	1,725.33	2,070.32	1,823.56
Total Income.....	\$6,799.93	\$8,712.20	\$8,705.05	\$6,711.34
	EXPENSE			
	1944	1943	1941	1938
Printing.....	\$3,751.22	\$6,546.56	\$5,767.38	\$5,801.05
Other Expense.....	851.84	2,097.40	1,997.86	2,064.35
Total Expense.....	\$4,603.06	\$8,643.96	\$7,765.24	\$7,865.40
Total Circulation.....	1,706	1,298	977	447

*Psychological Monographs.* The fiscal picture of the *Monographs* changes from year to year in unpredictable ways, depending on the character of the manuscripts accepted—some are more expensive to produce than others, while some authors require more copies than others. The *Monographs* are published on a commission basis designed only to cover the costs of handling.

In order not to upset the club arrangement, two volumes of the *Monographs* were supplied in order to compensate for the single volume of the *Journal of Experimental Psychology* provided during the year.

*Journal of Applied Psychology.* The financial picture of the *Journal of Applied Psychology* remains heartening during its second year under APA ownership. As was anticipated, we were able to make the payments on the purchase price of the journal from operating proceeds. (See Exhibit G.)

## EXHIBIT G

*Journal of Applied Psychology*

	INCOME	
	1944	1943
Library Subscriptions.....	\$4,489.21	\$3,905.05
Club Subscriptions.....	1,864.75	1,151.75
Other Income.....	1,677.28	1,233.57
Total Income.....	\$7,931.24	\$6,290.37
	EXPENSE	
	1944	1943
Printing.....	\$3,242.83	\$3,280.78
Other Expense.....	1,829.10	1,057.38
Payment on Purchase.....	916.64	none
Total Expense.....	\$5,088.57	\$4,838.17
Cumulated Balance.....	\$4,294.87	\$1,452.20
Circulation.....	2,035	1,624

*Wartime Delays.* Due to the numerous changes of address among members, we found it difficult to keep our mailing lists up to date. In 1943 we made some change in enough stencils to replace the entire list. Not everyone moved, but some people moved four or five times. In 1944, this fluidity continued in every greater volume.

In addition to this extra work, if a magazine is mailed to an incorrect address, it usually gets back to us several months later and has to be mailed again in replacement. In 1944, it was not unusual to have 150 to 200 changes of address in each mailing, and since there are more than 50 mailings each year, the extra labor occasioned by incorrect addresses proved to be very large.

In our reluctance to assume this waste labor, we several times delayed preparation of



wrappers beyond the usual time, to include last-minute changes. The extraordinary slowness of express shipments of wrappers further delayed appearance of the issues.

At other times responsibility for delay fell on unforeseen difficulties of printers who were handicapped by labor shortages in their wrapping and mailing departments, i.e., where their lowest paid labor is employed.

Respectfully submitted,

WILLARD L. VALENTINE, *Treasurer and Business Manager*

# REPORT OF EXAMINATION

AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.  
YEAR ENDED DECEMBER 31, 1944

## Auditor's Certificate

January 28, 1945

*American Psychological Association, Inc.,  
Evanston, Illinois.*

We have examined the balance sheet of the AMERICAN PSYCHOLOGICAL ASSOCIATION, INC., as of December 31, 1944, and the statements of income and expense and net worth for the year then ended, have reviewed the accounting procedures of the association and, without making a detailed audit of the transactions, have examined or tested accounting records of the Association and other supporting evidence, by methods and to the extent outlined in this report.

A summary of the balance sheets at December 31, 1944, and December 31, 1943 follows:

	Dec. 31, 1944	Dec. 31, 1943	Increase Decrease*
<i>Assets</i>			
Cash.....			
Marketable securities.....	\$ 72,717.75	\$57,193.00	\$15,524.75
Accounts receivable—net.....	53,024.58	38,274.58	14,750.00
Inventories:	4,493.07	3,170.10	1,322.97
Valuation placed on stock of back numbers of publications.....	1.00	1.00	—
	<u>\$130,236.40</u>	<u>\$98,638.68</u>	<u>\$31,597.72</u>
<i>Liabilities and Net Worth</i>			
Accounts payable.....	\$ 5,001.47	\$ 2,790.20	\$ 2,211.27
Contract payable.....	9,083.33	10,000.00	916.67*
Deferred income:			
Unexpired subscriptions.....	25,509.14	20,815.45	4,693.69
Miscellaneous deferred income.....	503.44	—	503.44
Reserved for special purposes.....	15,171.75	12,854.54	2,317.21
Net worth.....	74,967.27	52,178.49	22,788.78
	<u>\$130,236.40</u>	<u>\$98,638.68</u>	<u>\$31,597.72</u>

The following comments relate to the accompanying financial statements and to the scope of our examination:

Cash on deposit and in savings accounts was reconciled with the amounts shown in certificates received directly from the depositaries. Office cash funds were confirmed by



direct correspondence with the custodian thereof. The records of cash transactions for the year were checked by comparisons of the totals of cash receipts recorded in the cash book with deposits shown in monthly bank statements and by inspection of paid checks, invoices, or other data on file in support of the recorded disbursements.

Marketable securities which were presented for our inspection are shown below:

	Interest Rate	Cost	Redemption or Market Value Dec. 31, 1944	Accrued Interest Dec. 31, 1944
U. S. Savings Bonds—Series G due November 1, 1953.....	2½%	\$ 5,000.00	\$ 4,755.00	\$ 20.83
U. S. Savings Bonds—Series G due December 1, 1954.....	2½%	25,000.00	24,050.00	52.08
U. S. Savings Bonds—Series G due May 1, 1956.....	2½%	5,000.00	4,940.00	20.83
U. S. Savings Bonds—Series G due November 1, 1956.....	2½%	10,000.00	10,000.00	41.67
		<u>\$45,000.00</u>	<u>\$43,745.00</u>	<u>\$135.41</u>
Chesapeake & Ohio Railway Co. refunding and improvement mortgages—Series G due February 1, 1960.....	2 <sup>6</sup> / <sub>10</sub> %	7,802.50	8,020.00	86.67
Totals.....		<u>\$52,802.50</u>	<u>\$51,765.00</u>	<u>\$222.08</u>

The amount stated for accounts receivable was in agreement with the total of a listing of the individual accounts. We did not correspond with the debtors for confirmation of the balances due. Since the Association follows the policy of regarding income from dues for members and associates only when the payment therefor is received, no asset amount is shown in the balance sheet for unpaid dues.

All ascertained liabilities of the Association at December 31, 1944 have been provided for in the accompanying balance sheet.

Deferred income represents the unexpired portion of subscriptions to the various publications of the Association at December 31, 1944, and sundry income received which is applicable to 1945 advertising and monographs. We tested the computations of the Association with respect to the amounts deferred to cover the unexpired subscriptions.

Information submitted to us indicated that certain funds reserved for special purposes were not to be considered a part of the general funds of the Association. The Council has authorized that cash be deposited in a special savings account in the People's Savings Bank in Providence, to be used for post-war reconstruction of psychology. The amount of \$3,229.84 in this account represents the unexpended balance of funds received for the ninth international meeting plus accumulated interest (\$47.90 received in 1944) thereon to December 31, 1944. Under the terms of a gift whereby the Association acquired the Journal of Abnormal and Social Psychology, any surplus funds arising from its publication are to be used solely for the purposes of that journal. The amount of such surplus funds at December 31, 1944, was determined as follows:

Balance at January 1, 1944.....	\$ 4,672.60
Plus excess of income over expense for the year—as shown by accompanying statement of income and expense.....	2,011.31
Balance at December 31, 1944.....	<u>\$ 6,683.91</u>



Changes in the account *Assessment from members for maintenance of Office of Psychological Personnel* are next presented:

Balance at January 1, 1944.....	\$ 5,000.00
Collections.....	7,588.41
	<hr/>
	\$12,588.41
Amount applied as reduction of expense.....	7,330.41
	<hr/>
Balance at December 31, 1944.....	\$ 5,258.00
	<hr/>

The balance at December 31, 1944 is to be used to maintain the Office of Psychological Personnel during the year 1945.

### Opinion

In our opinion, the accompanying balance sheet and related statements of income and expense and net worth present fairly the position of the AMERICAN PSYCHOLOGICAL ASSOCIATION, INC. at December 31, 1944, and the results of its operations for the year, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

ERNST & ERNST  
Certified Public Accountants

### BALANCE SHEET AMERICAN PSYCHOLOGICAL ASSOCIATION, INC. December 31, 1944

#### ASSETS

#### Cash

Demand deposit.....		
Savings accounts (\$9,913.75 reserved for special purposes).....	\$39,453.09	
Office cash funds.....	33,199.66	
	<hr/>	
	65.00	\$72,717.75

#### Marketable Securities

U. S. Savings Bonds—at cost.....	\$45,000.00	
Railroad bonds—at cost.....	7,802.50	
	<hr/>	
Accrued interest on bonds.....	\$52,802.50	
	<hr/>	
	222.08	53,024.58

#### Accounts Receivable

For sales, reprints, printing costs, etc.....	\$ 5,730.81	
Less reserve.....	1,237.74	
	<hr/>	
		4,493.07

#### Inventories

Valuation placed on stock of back numbers of publications.....		1.00
	<hr/>	
		\$130,236.40
		<hr/>



## LIABILITIES AND NET WORTH

*Accounts Payable*

For printing costs and expenses.....	4,323.25	
To authors of Psychological Monographs.....	244.06	
Pay roll deductions—employees' income tax.....	434.16	\$ 5,001.47

*Contract Payable*

Due to Dr. James P. Porter for purchase of Journal of Applied Psychology—original contract \$10,000 payable \$83.33 per month.....		9,083.33
--	--	----------

*Deferred Income*

Unexpired subscriptions to:		
Psychological Abstracts.....	\$ 9,002.48	
Journal of Experimental Psychology.....	2,497.70	
Psychological Bulletin.....	3,768.91	
Psychological Review.....	2,185.10	
Journal of Abnormal and Social Psychology.....	2,044.32	
Psychological Monographs.....	2,820.85	
Journal of Applied Psychology.....	3,189.78	
	<u>\$25,509.14</u>	
Sundry deferred income.....	503.44	26,012.58

*Reserved for Special Purposes*

Funds to be used for post-war reconstruction of psychology.....	\$ 3,229.84	
Surplus funds of Journal of Abnormal and Social Psychology.....	6,683.91	
	<u>\$ 9,913.75</u>	
Assessment from members for maintenance of Office of Psychological Personnel for the year 1945.....	5,258.00	15,171.75

*Net Worth*

Balance at December 31, 1944.....		74,967.27
		<u>\$130,236.40</u>

## STATEMENT OF NET WORTH

## AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.

Year ended December 31, 1944

Balance at January 1, 1944.....			\$52,178.49
Add:			
Net income for the year as shown by accompanying statement of income and expense.....	\$24,847.99		
Less:			
Excess of income over expense of Journal of Abnormal and Social Psychology—credited to reserve for special purposes	\$2,011.31		
Portion of net income reserved for special purposes:			
Interest on funds to be used for post-war reconstruction of psychology	47.90	2,059.21	22,788.78
Balance at December 31, 1944.....			<u>\$74,967.27</u>







DISTRIBUTION OF CASH  
AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.  
December 31, 1944

<i>Demand deposit:</i>			
The Ohio National Bank, Columbus, Ohio.....			\$39,453.09
<i>Savings accounts:</i>			
The Ohio National Bank, Columbus, Ohio.....		\$2,974.09	
People's Savings Bank in Providence, Providence, Rhode Island:			
General.....	\$2,329.68		
Special.....	3,229.84	5,559.52	
Princeton Bank and Trust Company, Princeton, New Jersey.....		6,267.02	
Providence Institution for Savings, Providence, Rhode Island.....		2,716.98	
Rhode Island Hospital Trust Company, Providence, Rhode Island.....		2,078.14	
Security-First National Bank of Los Angeles, Los Angeles, California.....		2,737.40	
Union Square Savings Bank, New York, New York....		5,272.90	
Wells Fargo Bank & Union Trust Co., San Francisco, California.....		2,857.58	
Huntington National Bank of Columbus, Columbus, Ohio.....		2,736.03	33,199.66
<i>Office cash funds:</i>			
Secretary's office, University of Michigan, Ann Arbor, Michigan.....	\$	50.00	
Abstract editorial office, Brown University, Providence, Rhode Island.....		15.00	65.00
Total.....			<u>\$72,717.75</u>

CONSOLIDATED BUDGET FOR 1946  
*Estimated Income*

<i>Dues</i>			
Fellows @ \$10.50.....			\$10,500.00
Associates @ \$5.50.....			17,600.00
For Divisions @ \$1.00.....			4,200.00
Student Affiliates @ \$.50.....			50.00
<i>Subscriptions</i>			
Abstracts @ \$3.00.....			13,600.00
American Psychologist @ \$1.50.....			6,300.00
Club Subscriptions.....			12,000.00
<i>Income from Libraries</i>			
Subscriptions			
Abnormal.....	\$	4,000.00	
Abstracts.....		5,000.00	
Review.....		3,600.00	
Bulletin.....		3,700.00	
Experimental.....		3,000.00	
Monographs.....		2,000.00	
Applied.....		5,000.00	
American Psychologist.....		3,000.00	
			<u>\$29,300.00</u>



Back Number Sale.....	\$ 3,000.00	
Total Income from Libraries.....		32,300.00
Advertising.....		500.00
Income from Investments.....		1,000.00
Miscellaneous.....		1,000.00
From AAAP.....		5,500.00
TOTAL INCOME.....		\$104,550.00
ESTIMATED EXPENSES FOR 1946		
To Divisions.....		\$ 4,200.00
Printing Costs.....		34,400.00
Abstracts.....	\$ 7,000.00	
Amer. Psychol.....	10,000.00	
Bulletin.....	3,500.00	
Abnormal.....	3,400.00	
Review.....	3,000.00	
Experimental.....	4,000.00	
Applied.....	3,500.00	
	\$34,400.00	
Editorial Stipends.....		\$ 2,850.00
Abnormal.....	\$ 400.00	
Bulletin.....	400.00	
Review.....	400.00	
Experimental.....	400.00	
Applied.....	400.00	
Applied Monog.....	250.00	
Monographs.....	200.00	
Journ. Consltg.....	400.00	
	\$ 2,850.00	
Officers' Stipend.....		\$ 800.00
Recording Secretary.....	\$ 400.00	
Treasurer.....	400.00	
Editorial Salaries.....	\$ 800.00	
Abstracts.....		\$ 5,500.00
Amer. Psychol.....	\$ 2,500.00	
Abstractors.....	1,800.00	
	1,200.00	
	\$ 5,500.00	
Executive Secretary's Salary.....		\$ 7,500.00
Assistant to Secretary.....		\$ 1,800.00
Abstracts Editorial Office.....		\$ 1,800.00
Central Office Salaries.....		\$ 9,800.00



PROCEEDINGS OF FIFTY-THIRD ANNUAL MEETING

747

<i>Rental Central Office</i> .....		\$ 3,000.00
<i>Office Supplies</i> .....		2,500.00
<i>Supplies for Abstracts Office</i> .....		500.00
<i>New Equipment</i> .....		2,000.00
<i>Yearbook Printing</i> .....		\$ 2,500.00
<i>Audit</i> .....		\$ 500.00
<i>Annual Meeting Expense</i> .....		500.00
<i>Travel Fund, Executive Secretary</i> .....		2,500.00
<i>Committee Expense</i> .....		2,100.00
<i>On Washington location</i> .....	\$ 300.00	
<i>Election</i> .....	500.00	
<i>Com. Grad. &amp; Prof. Trg</i> .....	300.00	
<i>Com. on Clinical</i> .....	400.00	
<i>Com. on Publication, Trav</i> .....	400.00	
<i>Program Committee</i> .....	200.00	
	<hr/>	
	\$2,100.00	
<i>Memberships</i> .....		\$ 1,060.00
<i>Office of Scientific Personnel</i> .....	\$ 1,000.00	
<i>Intersociety Color Council</i> .....	25.00	
<i>American Council on Education</i> .....	10.00	
<i>National Soc. Rehabilitation</i> .....	25.00	
	<hr/>	
	\$ 1,060.00	
<i>Contingency</i> .....		\$ 5,000.00
		<hr/>
<i>TOTAL EXPENSES</i> .....		<u>\$90,810.00</u>



PROCEEDINGS OF THE FALL MEETING OF THE ROCKY  
MOUNTAIN BRANCH OF THE AMERICAN  
PSYCHOLOGICAL ASSOCIATION

LILLIAN G. PORTENIER, UNIVERSITY OF WYOMING

*Executive Secretary*

The regular annual fall meeting of the Rocky Mountain Branch, APA was held at the University of Colorado, Boulder, Saturday, October 13, 1945. For the fourth consecutive year the summer meeting of the branch was dispensed with due to war conditions.

William A. Blakely, Colorado College, was elected *Chairman* for the year 1945-1946 succeeding L. W. Miller. Lillian G. Portenier will continue as *Executive Secretary* for a three year term, 1944-1947.

PROGRAM

Saturday October 13

L. W. MILLER, Chairman

*Abilities and Interests of Japanese-American High School Seniors.* LILLIAN G. PORTENIER, University of Wyoming.

The subjects used for this study were the high school seniors for 1943, 1944, and 1945, respectively, about 675 students, at the Heart Mountain Relocation Project near Cody, Wyoming. The scores for the Heart Mountain seniors on the O.S.U. Psychological Test, the Hennon-Nelson Tests of Mental Ability, the Terman-McNemar Mental Ability Test and the Iowa Silent Reading Test, and information secured from a personal data sheet were compared with similar data for all Wyoming high school seniors, about 2,500 for each of the three years. The average scores for the Heart Mountain seniors were consistently lower than those for all Wyoming seniors and also lower than the norms on all tests. Some differences were highly reliable. The inferiority appeared to be due primarily to a language handicap. The Japanese-American students who came to Heart Mountain from California were inferior to those from Washington and Oregon on most of the tests. As compared with all Wyoming seniors a much smaller percentage of the Heart Mountain seniors indicated plans for continuing higher education and marked differences between the two groups in their vocational choices were also found. Racial prejudice and culture patterns appear to be factors.

*Lamarckian-Darwinian Reorientation.* T. H. HOWELLS, University of Colorado.

The issue of eugenics *versus* eugenics tacitly postulates the more general issue of Lamarckianism *versus* Darwinianism. It is argued that both of these supposed alternatives involve the same pseudo issue; they both arise from equivocal applications of Weismann's famous test of inheritance, that an inherited characteristic will be maintained in spite of environmental change, while environmental characteristics are temporary and their continuance is dependent upon maintenance of the special environment in which they were first produced. Change from the "original," supposedly-hereditary forms, however, proves (according to Weismann's test) that they are really no more permanent than the acquired forms. Since the test is itself fallacious, it can sire only false interpretations. The Lamarckian-Darwinian problem is therefore a spurious problem; both the Lamarckian and the Darwinian interpretations are false because they are both based on a differentiation which cannot be logically or objectively justified. There are no "hereditary" or "acquired" traits. If a genuine and realistic orientation towards



life and problems of genetics, both phylogenetic and ontogenetic, is to be achieved, both of these interpretations must be abandoned, since both are erected on the same fallacy and one is just as bad as the other. A reorientation, involving the hypothesis of levels of integration, and based on recent evidence of the similarity and chemical nature of genes and viruses, is suggested. The far-reaching implications of this reorientation for our prevalent approaches to psychological and sociological problems are pointed out.

*The Emotional and Vocational Problems in the Treatment of the Tuberculous.*

RUTH K. AXELRAD AND GERTRUDE K. FELSENBURG, National Jewish Hospital, Denver.

This is a description of the Social Service and Vocational Guidance program at the National Jewish Hospital, a non-sectarian, free hospital, established to care for the tuberculous from all parts of the country, who are unable to pay for private care.

Tuberculosis is characterized by three factors which make it necessary to employ extra-medical procedures in helping patients:

I. The chronicity of the disease and the tendency towards repeated breakdowns.

II. The long duration of treatment and need for isolation of the patient.

III. The lack of inhibition of mental functioning during the illness. Patients' emotional responses to the illness vary from euphoria to irritability and belligerence to depression, suicidal trends, and apathy. These responses are complicated by personality disturbances which existed prior to the illness. Treatment of these is required to insure cure and to prevent further breakdown. Therefore, tuberculosis results in social, vocational, and emotional problems requiring services of psychiatrists, social workers, psychologists, guidance counsellors, occupational therapists, group social workers, and teachers. The use made of these workers is decided upon on individualized case work basis dependent upon the needs, and follows full and careful appraisal of the total situation. Treatment of emotional problems needs to be supplemented by planning and training for suitable vocational goal. This goal is determined on the basis of the physical condition, intelligence and aptitudes, educational background, and the economic and social situation. Vocational training is carried on in the Hospital, and is sometimes completed under the auspices of a State Rehabilitation Department when the patient returns to his home state. Before a patient is discharged, home conditions are checked to see that they are favorable. The social service department's goal is to see that the patient is emotionally as well as physically ready for discharge.

*A Presentation of Data on the Mental Growth Curve, with Some Implications for Longtime Prediction.* ARNOLD H. HILDEN, Child Research Council and The University of Colorado School of Medicine, Denver, Colorado.

Data are presented on one group of the children being studied longitudinally at the Child Research Council. Chronological age is fifteen years or more. They have been given the Stanford-Binet Scale over a period of years. Number of tests per child averaged ten; the usual test interval was a year, never less. Mean IQ for the group, based on mean IQ for each child, was 117.31, S.D., 11.55. Mean variation in IQ was found for each case; the mean of these was 6.20. Fluctuations of considerable degree are not unusual, and do not seem dismissable simply as random errors of measurement. The possibility is suggested that they might reflect patterns of growth or developmental stages. Greater understanding of these changes may require correlative growth data from psychological and other fields, a study of intra-test relationships, and other analyses. It is interesting that the terminal IQ for each child appears more closely related to his highest IQ up to the age of 12 years (average, 1.12 points higher) than it does to the average of his IQ's up to that age (average, 9.79 points higher, difference is statistically significant, at a level



of less than 1%). The possibility is suggested that annual testing might provide a more accurate basis for predicting a child's ultimate potential test level.

*A General Scientific Method as a Basis for the Communication Arts.* ELWOOD MURRAY, University of Denver.

Communication training may become vitally needed training in human relations when it incorporates unto itself the available general scientific methods from linguistics, speech, psychology and general semantics. Through proper communications training the attitude of the scientist toward the phenomena in his test tube may be carried over into all human contacts and affairs. This will not be possible, however, until teachers of communication cease to teach these subjects merely as transmission. They must teach and must be prepared to improve the whole unified indivisible circuit of evaluation of facts, of transmission and projection, and of social integration. As teachers of the chief tests of human relations (such as reading, writing, speaking and listening) they must be prepared to teach students to evaluate appropriately, to be conscious of their abstractions, to avoid identification, and to recognize the orders of removal of verbalisms from the first order events which make up the world of process to which adjustment must be made.

*An Experimental Study of Proactive Inhibition as Exhibited in Immediate Recall of Consonants.* LORETTA K. CASS AND WM. A. BLAKELY, Colorado College.

A study of inhibitory influence on the recall of consonants where the main task was preceded by tasks of varying degrees of similarity to it points to the same general results obtained by E. S. Robinson and E. B. Skaggs in their 1927 study of retroactive inhibition. The main task consisted of varied lists of ten consonants each of which were presented visually by an exposure apparatus and recorded immediately by the subjects. Prior to the presentation of each list, the subjects were stimulated, in successive trials, first by ten intermittent buzzer sounds, next by ten intermittent flashes of light, then by one of six series of ten consonants which had no letters, 2 letters, 4 letters, 6 letters, 8 letters or all letters like the main task consonants. A rest period of duration equal to the time spent in the preliminary tasks of the other series served as a control trial. The experimenters concluded that proactive inhibition as exhibited in this investigation was most evident in the series where a medium degree of similarity between the preliminary and main tasks were secured and least evident in the cases of minimum similarity or exact repetition in the tasks.



# PSYCHOLOGY AND THE WAR

Edited by  
DONALD G. MARQUIS

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CORPORAL HARRY H. DAVIS

TERMINAL DATE FOR NRC PREDOCTORAL FELLOWSHIP APPLICATIONS

WHAT THE SOLDIER THINKS

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## HISTORY, ORGANIZATION, AND RESEARCH ACTIVITIES PSYCHOLOGICAL RESEARCH PROJECT (NAVIGATOR), ARMY AIR FORCES

STAFF, PSYCHOLOGICAL RESEARCH PROJECT (NAVIGATOR)  
*Ellington Field, Texas\**

### I. INTRODUCTION

This article is the ninth in a series dealing with the Aviation Psychology Program in the Army Air Forces. In previous articles (1, 2, 3, 4, 5, 6, 7) early phases of the Program and the organizations concerned with classification test development have been described. The most recent article (8) dealt with the present organization, policies, and research activities of the Program. A group

\* This article was prepared by the Staff of the Psychological Research Project (Navigator) and edited in the Psychological Section, Medical Research Division, Office of the Air Surgeon, Headquarters, Army Air Forces, Washington, D. C.



of articles, of which this is the first, has been planned to present the work of the Psychological Research Projects in the AAF Training Command.

The mission of Psychological Research Project (Navigator), hereafter designated as PRP(N), has been the application of psychological and statistical techniques to research in navigation in the Army Air Forces. The primary functions of the Project have been:

1. The development of an objective scale for measuring skill in navigation.
2. The evaluation of navigation training aids.
3. Research on the selection and evaluation of navigation instructors.
4. Training research in the navigation schools.

PRP(N) was activated in January 1944 at Selman Field, Monroe, Louisiana, and in December 1944 moved to Ellington Field, Texas. Since its inception Capt. Launor F. Carter has been the director. As of August 1944 the staff consisted of 6 officers, 10 enlisted men, and 2 civilians. In the following roster of the personnel the number after each name indicates length of assignment to the Project in months. The asterisk indicates men on duty as of 31 July 1945.

*Officers Who Have Been Assigned to Psychological Research Project (Navigator)*

	<i>Months on Duty</i>		<i>Months on Duty</i>
Abrams, Jack B.	3	Heathers, Glen L.	12
Brown, James C.	3	*Michael, Ruby E.	5
*Carter, Launor F.	19	Royce, Joseph R.	4
Christensen, Julien M.	8	*Smith, Leo P.	3
*Dudek, Frank J.	17	Van Saun, Horace R.	5
*Friedman, Seymour T.	4	*Zielonka, William A.	16

*Enlisted Men Who Have Been Assigned to Psychological Research Project (Navigator)*

	<i>Months on Duty</i>		<i>Months on Duty</i>
Brown, Gilbert C.	6	Levine, Solomon	9
Brown, William C.	2	Lyerly, Samuel B.	3
Cook, John O.	3	*Lyon, Wolcott M.	7
Dutton, Winfred E.	8	*Miller, Irving	2
Ernst, John	3	Munger, Allyn F.	11
*Erskine, Ernest	10	Ninneman, Lawrence	3
Friedman, Herschel	1	*Peltier, Thomas E.	7
Gage, Nathaniel L.	7	*Rosemark, Edward M.	7
*Glaser, Robert	19	Rust, Ralph	9
Grigg, Austin E.	14	*Smith, Harley B.	7
Hawthorne, Judson	3	*Smith, Herbert A.	10
Jenkins, Ernest A.	3	Swanson, Albert	2
*Joseph, Robert T.	11	Swarthout, Donald	2
*King, John P.	9	Wiley, Llewellyn N.	10
Kravetz, Nathan	9	Williams, Meyer	1

\* On duty 31 July 1945.

Rather than spend its energies in the performance of limited research and service functions for the navigation training program, the Project has attempted to develop new techniques for the treatment of psychological problems in the field of navigation. To accomplish this, the Project has found that psychological training is not enough and that a knowledge of the theory and procedures involved in navigation is essential for effective psychological re-



search. The Project has also recognized that research in the military situation must be of such a nature as to yield results which can lead to specific and practicable recommendations.

## II. OBJECTIVE MEASURES OF SKILL IN NAVIGATION

*A. Development of Printed Tests of Proficiency.* A major task undertaken by the Project has been the development of objective measures of skill in navigation. The assumption was made that the most proficient navigator is one who can best perform the various types of navigation. Consequently, the primary aim for the development of the measures was the construction of tests of proficiency of as many aspects of navigation as practicable. Different test media were necessary to provide maximum coverage of navigation theory, techniques, and procedures. The employment of printed tests, photographic tests, and check lists was considered essential in ascertaining over-all skill.

The first step was the construction of the Navigator Proficiency Test (Form A). The test contained 120 multiple-choice items and was divided into eight parts, each part covering a different phase of navigation. The test was adapted for use with a standard machine-scored answer sheet.

After administration of the test to 261 men about to graduate from navigation school and 366 returned combat navigators the responses were subjected to statistical analyses. The analyses included part-score intercorrelations, item analyses, and the determination of test reliability. When a comparison of the test grades was made with navigation school classroom and aerial grades, the test was found to be primarily a measure of theoretical classroom knowledge.

In the light of these results, a complete revision of the test was undertaken. The revised test, called the Navigator Proficiency Test (Form B), consists of nine parts and contains 228 items. The total testing time is approximately twice that of the former test. Two fundamental differences between the two tests may be noted. First, in Form B, an increased emphasis is placed upon techniques, procedures, and practical applications rather than upon theoretical aspects. Second, in addition to testing specific phases of navigation, Form B includes a part designed to test judgment in navigation. This part attempts to evaluate a navigator's ability to perform tasks in sequential procedures, to know the limitations of men and instruments, to apply general knowledge to a specific problem, and to improvise in unforeseen situations. A statistical analysis of Form B is now in progress.

One of the types of navigation that does not yield to measurement by a printed test is pilotage. This technique of navigation requires the location of position in the air by the identification of ground features on a map. To measure ability in pilotage a test is being developed making use of aerial photographs. The subject is presented with a booklet of photographs and another booklet containing maps on which he is to identify the pictures. The sequence of photographs simulates the flight of a plane along a given course with the navigator looking at the ground at intervals. Time limits for viewing each photograph give the effect of the pacing required when moving over the terrain. To further insure the similarity of this procedure to the conditions in the air, the subject is not permitted to turn back in the photographic booklet to pictures which he was unable to identify earlier. All identification points are lettered to facilitate the use of a machine-scored answer sheet. Two other important features of the pilotage test are the use of oblique photographs to allow a broader view of the terrain and the use of a magnetic wire recorder to present the test instructions in an optimally standardized manner.



To add to the comprehensiveness of the instruments for measuring navigation skill, a further test was designed to present the air navigation situation in the classroom. This test is entitled the Navigator Proficiency Test—Map Reading and Dead Reckoning (Motion Picture Test) and consists of a motion picture of the terrain traversed on a 90-minute flight mission. Views of navigation instruments, operating in the same manner as in actual flights, are presented in the film. The instrument readings and the passage of the terrain below are carefully synchronized to simulate actual flight conditions. An important advantage of this test is its flexibility of application inasmuch as proficiency on several phases of navigation can be evaluated simultaneously. The use of the film as a training aid also shows promise.

To determine an individual's proficiency in the use of specific navigation instruments, the development of a series of performance check lists has been begun.

The testing devices discussed above are thought to constitute a sufficiently comprehensive and objective series for measuring skill in navigation on the ground.

*B. Evaluation of Navigation Performance in the Air.* Important in the construction of a comprehensive measure of navigation proficiency is the measurement of actual navigation performance in the air. A technique for measuring on-the-job performance would be expected to yield a criterion by which tests could be validated and training methods and training aids evaluated. Investigations showed that the usual measures of performance in the air were quite unreliable, because of the subjectivity of the grading system and the presence of many unstandardized conditions. In view of these findings PRP(N) proceeded to devise a means of evaluating navigator performance in the air.

The technique developed by the Project requires that a mission be flown by a number of planes in formation so that the students in each plane encounter the same conditions of flight. Two expert navigators fly with the formation to obtain the data from which a standard log can be compiled and by which student logs can be evaluated. (A log is a record of the navigation carried on during the mission.) To insure a reliable measure of performance, the mission is divided into four parts which are evaluated independently.

An important aspect of the technique is the manner by which student performance is graded. Employing the data obtained by the two expert navigators, a criterion is developed for each navigation variable on each part of the mission. The deviation of a student's estimate of each navigation variable from this standard is called his "error score." In this way each variable in the navigation procedure is scored independently.

A study of aerial performance indicates a moderate degree of intramission reliability computed by correlating the first and fourth parts of a mission against the second and third parts. Inter-mission reliability is very low. Further analysis indicates that the low reliability is the result of several factors: considerable learning occurs between missions, weather and other flight conditions vary between missions, and practical flight operations require that different planes with instruments varying in accuracy be used from mission to mission. At the present time modifications are being made to standardize the procedure further and thus increase its reliability.

### III. RESEARCH IN TRAINING

Research has been undertaken to isolate the component factors involved in basic navigation (precision dead reckoning ground plot) and to determine



the relative importance of these factors. If this is accomplished, valuable information can be obtained about many problems encountered in navigation and navigation training. For example, it is possible from the results of such research to determine how much instrument readings should be emphasized in teaching navigation and which instruments should be stressed early in training. Furthermore, objective information should be available concerning desirable modification of certain instruments.

In these studies data from student logs obtained by the technique described above are analyzed by two statistical methods, factor analysis and multiple correlation. In the first method the matrix of intercorrelations of student error scores on the various navigational variables is computed. From this matrix factors are extracted which can be interpreted as factors involved in the performance of basic navigation.

In employing the second method it is assumed that the criterion of a good navigator is how accurately he determines his position. A multiple regression equation is computed which gives the relative weights of the different navigational variables in predicting a student's error score in determining position.

The application of both these methods has demonstrated that the primary source of error in determining the course flown is to be found in only one of the three major operations. On the basis of this study PRP(N) recommended that navigation schools place more emphasis on certain training procedures and that modifications be made in certain navigation instruments.

Aside from practical suggestions such as the one presented above, the main contribution thus far in this phase of the work is the presentation of an approach by which the problems of navigation and navigation training can be analyzed and evaluated.

Because the research on the factors involved in navigation was undertaken at a particular stage in the navigation course, the Project sought to obtain information about the importance of the navigational variables at other stages of training. At the present time an attempt is being made to determine the curve of learning basic navigation. Periodically throughout the course of an experimental class in navigation school, standardized flight missions are conducted, from which measurements of the student proficiency at different stages in the course are obtained and the curve of learning can be determined.

It is contemplated that from this study it will be possible: to say whether or not students who graduate from the course have reached the peak of proficiency in their ability to carry out basic navigation; to determine the kind and amount of training necessary to bring students up to a particular level of performance during the course; and to investigate the reliability of student performance from mission to mission. This information is essential for the establishment of a definitive policy for eliminating students with little promise of becoming good navigators.

As an important part of its research in training, the Project undertook an extensive evaluation of a navigational training aid. A controlled experiment was conducted to determine the contribution of this training device to proficiency in navigation. The technique for measuring performance in the air was applied in the study. The experiment was designed to compare two groups of cadets whose training was the same except for training aid experience. The experimental population consisted of four classes of about forty navigation students each. Each of the classes was divided into two groups matched so that their average navigation aptitude scores (stanines) were equal. Of the two groups in each class, one was designated as the "trainer" or experimental group



and the other as the "classroom" or control group. This division was made to counterbalance two variables. The first was instruction within classes. It was quite possible that navigation instruction differed from class to class and by dividing each class into two groups equality of instruction was maintained. The second variable was that of flight missions. Each class flew as a unit and relatively independently of the other classes. Hence, it was possible that corresponding missions in the course, flown by different classes, would not be comparable because of different conditions of flight. Throughout the experimental portion of the training program, a navigational problem on the ground preceded each flight mission. At this time the trainer group performed the problem with the training aid while the classroom group performed the same problem in the classroom.

The performance of the students on flight missions, i.e., their actual performance as navigators in the air, was used as the criterion by which the two groups were compared. Three standard criterion missions were conducted. For each mission it was necessary to control all the variables which might have influenced the error scores of the students in each group. For example, a student's position in the plane might have contributed to his score for the variable "wind drift," since the first two seats in the plane were equipped with gyro-stabilized instruments for determining drift while the instrument in the third seat was non-stabilized. To counteract this difference in instruments, each student sat only once during the three missions in a given seat in a plane. To counterbalance differences between the planes in the formation, such as instrument variation and differences in pilot ability, there were always two men from the trainer group and one from the classroom group in each plane, or vice versa. In an effort to eliminate any cooperation between students, no student ever flew with the same men twice.

From each student's log error scores were obtained for 13 navigational variables, each of which was subjected separately to statistical analysis. The first step in analyzing these data was the determination of the means and standard deviations of the error scores on each variable for the two groups. On the basis of these statistics, hypotheses concerning the differences between the groups were drawn. However, before these hypotheses could be accepted or rejected it was necessary to examine them in the light of the uncontrolled factors which influenced the error scores. These factors will have to be evaluated as contributors to the error scores before any accurate conclusions can be drawn about group differences. To accomplish this, analysis of variance is being applied to the data so that the effects of certain of the uncontrolled variables will be ascertained and valid conclusions drawn regarding the various hypotheses.

#### IV. RESEARCH ON THE SELECTION OF INSTRUCTORS

Another of PRP(N)'s major areas of research has been the development of tests for the selection of navigation instructors from returned combat navigators. Considerable effort has been expended in attempting to validate tests which seemed to be discriminative. However, validation studies have been hindered by constantly changing military conditions which have resulted in discarding of certain validation criteria and searching for new ones. Efforts to follow a sample group of instructors through their training and out into the field as active instructors have been retarded by the rapid turnover of personnel in the navigation schools.

The construction of instructor selection tests has proceeded on three main



assumptions. On the assumption that favorable attitudes and interests are essential to success in teaching, the Project developed a Survey of Attitudes designed to reveal the degree to which the examinees possess attitudes and interests favorable to teaching. The second assumption was that a certain amount of general scientific knowledge is necessary for an individual to be able to present the scientific phases of navigation effectively. On this assumption a Scientific Background Test was developed, consisting of 60 multiple-choice items on various elementary scientific subjects. A third test, an Instructional Judgment Test, was constructed on the hypothesis that a measure of the ability to make intelligent judgments about various pedagogical problems would correlate with success as an instructor. This test consists of items which require the subject to make a decision about how to handle certain teaching situations. The three tests described above, together with a test of navigation proficiency and the recommendations of superior officers, constitute the basis for a procedure designed to select combat returnees for Instructors School.

Two general kinds of criteria have been employed in the validation of these tests. Criteria based upon measures of performance in Instructors School while the returnee is still taking his teacher training are called "in-training" criteria those based upon estimates of an instructor's performance while he is actually on the job teaching navigation are called "on-the-job" criteria.

Three types of measure have been used as in-training criteria. The first is derived from two forms, the Instructor's Weekly Report and the Qualification Report. The former is a rating scale on which a trainee's weekly performance is evaluated by his instructor. The latter provides over-all ratings on the course work and instructor qualities of the trainee by all his instructors at the end of the course. The Qualification Report is partially dependent upon the weekly reports. A second criterion is an instructor's evaluation of a trainee made by quartile ratings in each separate class section. This evaluation is based on the instructor's over-all impression of the trainee's proficiency in Instructors School. A third criterion measure is the recommendation of a navigator by his instructor in Graduate School. (All returned combat navigators are sent to Graduate School after their return from overseas and prior to further assignment.) This recommendation is a rank order rating of all men desiring to be instructors. Under conditions prevailing at the time instructor selection research began, the Qualification Report was a fairly satisfactory criterion measure. Changed conditions in the Instructors School, however, tended to reduce its sensitivity greatly. The other criteria have been shown to be unreliable and not satisfactory measures for the validation of instructor selection tests.

The on-the-job criterion measures consist of four ratings on which the teaching ability of an instructor is evaluated by his students, by his co-workers, by his supervisors, and by himself. Fourteen items are identical in the rating scales used, thus making it possible to determine the amount of agreement among the raters. Recently, when the opportunity presented itself, the Project shifted the emphasis in validating the instructor selection tests from in-training criterion measures to on-the-job measures which are now being collected.

## V. WORK IN THE NAVIGATION SCHOOLS

The participation of PRP(N) in problems pertaining specifically to the teaching program of the navigation schools has been largely advisory. Since the schools have departments of research and development which investigate problems of teaching methods, curriculum development, and grading tech-



niques, the Project has contributed its services only when research of a particular psychological or statistical nature has been required. The chief contributions to the school training programs have been the participation of the project personnel in the development of a standardized grading system for flight missions and the construction of certain questionnaires.

One of these questionnaires was a Survey of Student Opinion. In developing this questionnaire an effort was made to utilize the opinions of the students in the navigation schools to assist in the improvement of the curriculum and of the performance of the instructors. The Survey consists of two parts. The first part deals with the student's evaluation of the course of instruction. It consists of a booklet of 29 items in which questions are asked about the general nature of the course and the effectiveness of instruction, examinations, and flight missions. The second part is a 15 item rating scale on which each student rates his instructors with respect to qualities such as knowledge of subject matter, ability to arouse and maintain interest, and control of the class. The first item of the scale asks the student to indicate how sure he is of his ratings. The ratings on the second part of the student questionnaire are summarized in a profile which gives the instructors a graphic picture of their strong and weak points as judged by the students. In addition, the instructors are presented with a set of norms which enable them to determine their position in relation to other instructors on each of the qualities rated in the scale. In the administration of the Survey of Student Opinion the student is not asked to sign his name and is requested to be as truthful as he can be. The questionnaire is currently being used at the various navigation schools and from its results pertinent recommendations on curriculum, instruction, and grading have been made.

Another questionnaire is a Survey of Conditions in Combat Navigation. It was constructed for the purpose of supplying data which would be useful in suggesting curriculum changes in the navigation schools, suggesting revisions in the measures of navigation proficiency, offering valuable information for aircrews undergoing training in the States prior to going to combat, and providing information for the selection of "lead" navigators.

The questionnaire consists of 150 multiple-choice items and is intended to secure a comprehensive picture of a returned combat navigator's experiences. Specifically, the questionnaire seeks to obtain information on the physical conditions of a combat tour in various air forces, including the number of missions flown, opposition encountered, causes for loss of aircraft, and conditions at the base of operations; the kinds of navigation employed in the various theaters of operations; the frequency with which various navigational techniques were used; the combat navigator's evaluation of his training as a navigation student; and the agreement among navigators as to the characteristics required of successful lead navigators.

The questionnaire has been administered to over 600 returned combat navigators from both the European and the Pacific areas. An item analysis of these data has been completed and, after a revision of the items based on this analysis, extensive use of the questionnaire is anticipated.

## VI. SUMMARY

The Psychological Research Project (Navigator) has initiated the application of the techniques of psychology to research in navigation. Since its inception the Project has constantly expanded its activities in the hope of



increasing its value to the Army Air Forces navigation program. The results of this emphasis upon fundamental research demonstrate the soundness of this approach and indicates the desirability of continuous basic research in the Army Air Forces.

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# THE ARMY GENERAL CLASSIFICATION TEST

## STAFF, PERSONNEL RESEARCH SECTION

*Classification and Replacement Branch, The Adjutant General's Office*

I. *Introduction.* An important milestone in the history of psychometrics was established in World War I with the development of Group Examination Alpha. Not only was this the pioneer paper-and-pencil test of mental ability, but for more than twenty-five years, it has held a clear title to the honor of being the most widely administered test. This honor now passes to the Army General Classification Test whose upwards of nine million administrations leaves it no challenger to the title.

The Army General Classification Test (AGCT) is a test of "general learning ability." Developed by Army personnel technicians, it was completed before the first draftees arrived at reception centers in 1940 and has been given to every literate inductee since that time. During more than four years of use, four separate but comparable forms of the test were developed and released. AGCT-1a was released in October 1940, 1b in April 1941, and 1c and 1d in October 1941. The first two forms were discontinued (except for use of supplies on hand) with the release of forms 1c and 1d, and these latter were used continuously until replaced by a new type test battery, the Army General Classification Test-3, in April 1945.

AGCT-1 contains three types of items in spiral-omnibus form: vocabulary, arithmetic, and "block-counting." Forms 1a and 1b contain 150 test items and a separate practice booklet; 1c and 1d include 140 scored items and 10 practice items. All items are of the four-choice multiple choice variety, arranged for administration with a separate answer sheet to enable either hand or machine scoring. The time limit for all forms is 40 minutes, and the raw score is the number of "rights" minus one-third of the number of "wrongs."

II. *Development of AGCT-1a.* In the spring of 1940, a Personnel Testing Section was established under the War Plans and Training Officer of The Adjutant General's Office. With a small staff of two or three reserve officers on temporary tour-of-duty status, one civilian personnel technician (detailed from the Air Corps Technical School) and a few clerks, this section was assigned the task of developing a classification test for use with recruits reporting at receiving centers in the Army. The proposed test, to be used in the same manner as the Group Examination Alpha, was to be capable of reliably sorting new arrivals according to their "ability to learn quickly the duties of a soldier." In April of the same year, a Committee on Classification of Military Personnel Advisory to The Adjutant General's Office was established by the National Research Council. At the first meeting of this group, May 24, 1940, the proposed new test was discussed and the work so far accomplished was outlined. In a report to the Committee at this meeting, Lt. Colonel (then Captain) M. W. Richardson enumerated the following specifications for the test:

1. The test includes both verbal and non-verbal items.
2. Assuming that modern warfare is rapidly becoming more technical, emphasis is placed upon items calling for spatial thinking and for quantitative reasoning.
3. It is planned to keep at a minimum items greatly influenced by amount of schooling and by cultural inequalities generally. To this end, the use of information items is not planned.



4. Insofar as possible, the time or speed element is to be minimized.
5. The general classification test is not intended to serve the purpose of trade tests.
6. It is specifically recognized that the test does not measure personality traits.
7. The test must appeal to the average officer and soldier as sensible.

At this time, approximately 5,000 test items had been constructed, including the following types: arithmetic reasoning, common sense, vocabulary, number series, synonyms and antonyms. In an effort to minimize the verbal character of the materials, work was being done with pictorial items (cubes, plane figures, etc.). In June an experimental test, containing some of these materials was printed but proved to be too restricted in range of difficulty. Later a preliminary test composed of vocabulary, arithmetic, and block-counting items, in separate sections, was printed. And by August 1940, the first form of the Army General Classification Test (AGCT-1a) was ready for standardization. This form, like all subsequent editions, contained the same three kinds of items—vocabulary, arithmetic and block-counting—but was arranged in spiral-omnibus form.

III. *Standardization of AGCT-1a.* In World War I, the Group Examination Alpha was not administered on an Army-wide basis until the early part of 1918, by which time more than two million men had already been inducted and trained. The problem of standardization, therefore, was relatively simple. In 1940, it had been decided to provide a set of norms for easy interpretation of AGCT scores in such fashion that the average soldier would receive a score of 100 and the standard deviation of all scores would be 20. But in order to prepare this standard score scale in time for use with the earliest draftees, it was necessary to standardize the test for a population that had not yet been selected. In other words, it was necessary to compute a set of derived "Army Standard Scores" based on the universe of potential draftees. Since it was impossible to administer the test to a representative sample of the potential Army population, it was decided to administer it to a group of available men and to estimate the mean and standard deviation of the population from the statistics of the tested sample by means of a weighting technique. An optimal weighting procedure would require that the sample be stratified with respect to all variables whose joint effects would account for all of the test variance. Since it was impossible to infer all possible correlates, it was assumed that an adequate proportion of test variance would be accounted for by the three factors of age, education and area of residence.

The AGCT-1a was, therefore, administered to a sample composed of 3,790 Regular Army enlisted men and 606 CCC enrollees. After the selection of cases in the desired age brackets (20–29 years) and elimination of those with incomplete information regarding education and residence, the sample was reduced to 2,675. The computation of the Army Standard Score scale was then carried out in five steps:

1. Determination from census data of the proportion of the total potential Army population in each age group by education and by area of residence.
2. Determination of the same proportions for the sample tested.
3. Weighting each cell of the sample so that its characteristics with regard to the variables of age, education and residence were the same as those of the total population.
4. Determination of the estimated parameters of the potential population from the weighted raw score mean and standard deviation of the sample.
5. Computation of Army Standard Score equivalents for each AGCT raw score by linear transformation.



It is recognized that this method involves a number of assumptions which cannot be demonstrated to be in accord with the facts:

1. That the three variables considered account for a large proportion of the test variance.
2. That the distribution of scores within each cell of the sample is random with respect to the distribution of scores in the corresponding cell of the total potential population.
3. That there is no differential death rate for the various age groups (since the age distributions of the 1940 potential Army population were estimated from the 1930 census data).
4. That the actual Army population would be a random sample of the total potential Army population, i.e., that no bias would enter into the selection of those men in the total potential Army population who were to be drafted.

If these assumptions were justifiable, and if distribution of AGCT standard scores in the potential Army population were normal, then it might be expected that the actual distribution of AGCT standard scores of inductees would be normal and that the percentages in each of the five Army Grades would be those listed in Table I (Expected Percentages). The obtained grade distribu-

TABLE I  
EXPECTED AND OBTAINED DISTRIBUTIONS OF ARMY GRADES ON AGCT-1a

Army Grade	Limits in terms of Stand- ard Deviation*	Limits in terms of Army Standard Scores*	Expected Percentages	Obtained Percentages†
I	$+1\frac{1}{2}\sigma$ and above	130 and above	7	9.0
II	$+\frac{1}{2}\sigma$ — $+1\frac{1}{2}\sigma$	110—129	24	36.4
III	$-\frac{1}{2}\sigma$ — $+\frac{1}{2}\sigma$	90—109	38	29.0
IV	$-1\frac{1}{2}\sigma$ — $-\frac{1}{2}\sigma$	70—89	24	17.0
V	Below $-1\frac{1}{2}\sigma$	Below 70	7	8.6

\* On 15 July 1942 the lower limit of Grade IV was extended downward an additional half standard deviation from Army Standard Score of 70 to 60.

† Based on the population of 589,701 cases reported from November 1940 to October 1941.

tion (last column, Table I) indicates that this expected distribution was only approximated, and suggests that the assumptions involved in the standardization were not entirely warranted. In the first place, it was not practicable to include race as a variable in the weighting procedure. Secondly, the actual Army population does not truly reflect the potential Army population due to the selective elimination of those with low mentality and those with occupational and dependency deferments. There are doubtless a number of other factors which account for the discrepancy between the expected and obtained distributions.

IV. *Alternate Forms.* Following the release of the AGCT-1a, work was started on the preparation of alternate forms. The first of these, form 1b, was authorized for use in April 1941. It contained the same three kinds of items as form 1a: vocabulary, arithmetic and block-counting. The vocabulary items were presented in context, instead of in the "means the same as" form of AGCT-1a. The block-counting items were the same as those in the earlier form.



AGCT-1b was standardized on a population of 3,856 men who were also given the 1a form. The raw score means and standard deviation for the two forms, and the coefficient of correlation between forms were as follows:

	AGCT-1a	AGCT-1b
Mean	77.7	77.6
Standard Deviation	29.2	31.4
Correlation between forms	.954	
Number of Cases	3,856	

Standard score equivalents for each 1b raw score were computed from the combined regression equations of the correlational surface (i.e., linear transformation to a distribution having the same mean and standard deviation as the 1a standard score distribution for the population involved). This method was logical in assuming the error variance to be distributed equally between the two tests. And it resulted in an Army grade distribution for 1b which closely approximated that for 1a, which was desirable from the view point of field use.

Forms 1c and 1d were prepared at the same time and were released in October 1941. Questions concerning modifications in content and format were considered, but were resolved in favor of the earlier forms. All items were newly constructed for each form except that the same block-counting items were used in both. The separate practice booklet was dropped, and the fore-exercise incorporated into the test booklet itself. The number of practice items was reduced to ten, and the number of test items to 140. The time limit remained the same.

Forms 1c and 1d were standardized at the same time on a population of 1,782 cases. This group was administered both new forms, in counterbalanced order, and scores on form 1a were obtained from the records. The means and standard deviations of the three forms are given in Table II. The two new forms

TABLE II

MEANS AND STANDARD DEVIATIONS OF THE VARIOUS FORMS OF AGCT. STANDARDIZATION OF FORMS 1c & 1d.

<i>Form</i>	<i>N</i>	<i>Mean*</i>	<i>Standard Deviation*</i>
1a	1782	104.37	23.41
1c	1782	59.72	26.90
1d	1782	59.05	26.27

\* Values for 1a are expressed in Army standard scores; and those for 1c and 1d are in terms of raw scores.

are very well matched in difficulty, as judged by their means and standard deviations. No comparison between old and new forms is possible since the 1a values are given in terms of standard scores. In general, however, forms 1c and 1d are somewhat more difficult than 1a, and are more discriminating in the upper ranges of ability.

Standard score equivalents for the new forms were computed by a method which was intended to reduce some of the negative skewness of the earlier distributions, and at the same time, keep the meaning of the standard score scale for all forms essentially the same. This method involved the construction of an arbitrary criterion distribution for the population tested based on the



combined values of all three forms, and the scaling of 1c and 1d raw scores against this new criterion distribution by the method of "equivalent percentiles." The resulting conversion table was used for both 1c and 1d. Using the same score limits for the five Army grades as with the previous editions, the two new forms placed 2-3% fewer men in grades I and II, and about the same percentage more men in the two lower grades. The distribution of 1c and 1d scores paralleled the theoretical normal distribution through the upper score ranges but deviated markedly below the mean. This marked discrepancy was mainly produced by the application of the test to illiterates or semi-illiterates who were completely unable to cope with it. Nearly a fifth of all the scores in the Grade V range are in the standard score interval of 40-44, and 27 per cent of them are below 50. When it is considered that the raw score equivalents of these intervals are;

<i>Standard score interval</i>	<i>Raw Scores</i>
40-44	0, 1
45-49	2, 3

it is obvious that many men for whom the test is not appropriate are included in the distribution.

From the Army viewpoint, the excess of Grade V's was disturbing, since, rightly or wrongly, this grade has come to have a stereotyped meaning which often leads unit commanders to protest if allotted too many such men. As an expedient, therefore, the Grade V range was arbitrarily narrowed by extending the lower score limit of Grade IV an additional half standard deviation downward. This, of course, had no effect upon the distribution of scores but altered the grade distribution considerably. With these new score limits, the grade distribution became much more symmetrical, as shown in Table III. This table is based on more than 8 million cases tested in reception centers throughout the country prior to January 1945.

TABLE III

GRADE DISTRIBUTION OF MEN PROCESSED THROUGH RECEPTION CENTERS 1940-1944

<i>Army Grade</i>	<i>Standard Score Limits</i>	<i>Percentage of Total Group</i>
I	130 and above	6.0
II	110-129	26.5
III	90-109	30.5
IV	60-89	27.7
V	59 and below	9.3
Total number of cases.....		8,293,879

V. *Reliability.* The reliabilities of each of the forms of AGCT have been computed a number of times and by various methods. Typical values of these reliability coefficients are presented in Table IV. These reliabilities are consistently high with the exception of the retest reliability of form 1a. There are several reasons for this: the interval between tests varied considerably; the conditions under which the tests were administered varied from test to retest; the population is highly selected (mean score of 118.6) and narrowly restricted in range (SD of 12.2). The correlations between forms are generally high, permitting them to be used interchangeably.

VI. *Relation to Other Variables.* Performance on AGCT is not related to age. The correlation, in a representative Army population, is .02 (Table V).



TABLE IV

RELIABILITY COEFFICIENTS OF THE VARIOUS FORMS OF THE ARMY GENERAL CLASSIFICATION TEST

<i>Form</i>	<i>Method</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Coefficient of Reliability</i>
1a	Kuder-Richardson #21	2,675	75.7*	24.5*	.94
	Odd-even, corrected	639	—	—	.97
	Retest (various intervals between tests)	501	118.6	12.2	.82
	Alternate forms	472	1a 87.7*	27.2*	.89
			1b 88.2*	24.4*	
1b	Kuder-Richardson #21	495	76.1*	31.7*	.97
	Alternate forms	3,856	1b 77.6*	31.4*	.92
			1a 77.7*	29.2*	
1c	Kuder-Richardson #21	1,782	59.7*	26.9*	.96
	Alternate forms	593	1c 60.0*	27.3*	.90
	(1-13 week interval)		1a or b 104.4	23.9	
1d	Kuder-Richardson #21	1,782	59.1*	26.3*	.96
	Alternate forms	593	1d 59.6*	26.6*	.95
			1c 60.0*	27.3*	

\* Values expressed in raw scores; all others in standard scores.

There is some evidence, however, that with older and more highly selected groups, the correlation is negative. With two groups of officers, for example, whose mean AGCT scores were 122.2 and 120.4 (SD's 12.5 and 11.9) and whose mean ages were 31.6 and 32.8, the correlations between AGCT and age were  $-.33$  and  $-.20$  respectively. This negative relationship is doubtless due in part, at least, to the fact that AGCT is administered as a time-limit test, and the speed element may be important despite original intentions.

As might be expected, the correlation between AGCT and education is rather high (Table V). With education expressed in terms of highest grade completed, the correlation is  $.73$ . When expressed in terms of number of years of education, the correlation is slightly lower; for some 20 different samples, the coefficients ranged from  $.16$  to  $.66$  with a median value of  $.60$ .

TABLE V

CORRELATION OF AGCT WITH AGE AND EDUCATION

<i>Variable</i>	<i>Form</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>r</i>
Age	1a	4330	70.4*	24.4*	.02
Education (highest grade completed)	1a	4330	70.4*	24.4*	.73
Education (number of years in school)	1c	500	104.1	21.5	.66
Education (number of years in school)	1c	461	116.9	14.5	.46
Education (number of years in school)	Unidentified	478	106.9	20.9	.66

\* Values given in raw scores; all others in standard scores.



The relationship between the AGCT and some other well-known tests of mental ability (or intelligence) is shown in Table VI. Unfortunately, for the purpose of answering questions of comparability, most of these data are not wholly satisfactory. For the most part, the correlations listed are by-products of studies designed for other specific purposes. Most of the populations involved were consequently preselected on the basis of one or another of the two tests with a restriction in range on one or both variables.

This truncation is demonstrated by the AGCT means and standard deviations of the samples listed in the table. In three cases, the AGCT means are well above 100 and in four cases the standard deviations are less than 20.\* Two of the populations cited approximate the AGCT distribution of the total Army, and in both of these cases the correlation is high. Evidently the AGCT, the Army Alpha, and the Otis test yield roughly comparable results over the range of ability represented in the Army.

TABLE VI

CORRELATIONS BETWEEN AGCT AND VARIOUS OTHER TESTS OF MENTAL ABILITY

Test	N	AGCT		r
		Means	SD's	
Army Alpha (Well's Revision-long form)	434	115.4 <sup>a</sup>	12.3	.79
Army Alpha (Well's Revision-long form)	750	98.3 <sup>b</sup>	22.7	.90
Otis Higher Mental Ability Examination	1646	103.5	23.1	.83
ACE Psychological Examination	885	127.7 <sup>c</sup>	12.4	.65
ACE Psychological Examination	1371	114.1 <sup>d</sup>	16.3	.79
Army-Navy College Qualifying Test, C-3	251	108.6	14.5	.75

<sup>a</sup> Population preselected on basis of Army Alpha score.

<sup>b</sup> Population selected to match the AGCT grade distribution of all men processed through reception centers in 1943.

<sup>c</sup> Population of AST trainees preselected by education and AGCT score.

<sup>d</sup> Population of high school graduates selected to match the AGCT grade distribution of all high school graduates in the Army.

VII. *Validity of the AGCT.* The major usefulness of the AGCT in the Army has stemmed from its value in selecting men for a large number of specialist training courses. Several hundred validity coefficients attest to its value in this connection. A sample of these validity coefficients is presented in Table VII. One or two points about the data presented there should be noted. In the first place, as is evidenced by the means and standard deviations listed, most of the populations were preselected on some variable correlated with AGCT (education, civilian occupation, etc.) or on AGCT itself. Secondly, in most instances the criterion employed is academic grades in the training course. Both of the points should be considered in drawing conclusions from the data contained in Table VII.

According to the table, the AGCT appears to be of value in predicting grades in a wide variety of training assignments. In the technical training courses (excluding the last three categories in the table) the correlations with

\* Since these data are presented in terms of Army standard scores, the mean and standard deviation of a representative Army population would approximate 100 and 20 respectively.



TABLE VII

VALIDITY COEFFICIENTS OF THE AGCT. VARIOUS EXAMPLES

<i>Population</i>	<i>Criterion</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>r</i>
Administrative Clerical Trainees, AAF	Grades	2947	121.7	11.1	.40
Clerical Trainees, AAF	Grades (weighted)	123	125.9	9.9	.44
Clerical Trainees, Armored	Grades	119	125.3	8.3	.33
Clerical Trainees, WAAC	Grades	199	116.8	12.0	.62
Airplane Mechanic Trainees	Grades	99	104.8	10.6	.32
Airplane Mechanic Trainees	Grades	3081	118.1	10.7	.35
Motor Mechanic Trainees	Grades	318	88.3	24.4	.69
Tank Mechanic Trainees	Grades	237	116.6	11.3	.33
Aircraft Armorer Trainees	Grades	1907	117.3	10.9	.40
Aircraft Armorer Trainees	Ratings	449	112.7	12.1	.27
Aircraft Welding Trainees	Grades	583	114.8	10.3	.26
Bombsight Maintenance Trainees	Grades	195	129.1	10.5	.31
Sheet Metal Trainees, AAF	Grades	764	115.6	10.3	.27
Teletype Maintenance Trainees, AAF	Grades	487	123.5	12.1	.20
Radio Operator & Mechanic Trainees, AAF	Grades	1055	122.4	11.1	.32
Radio Operator & Mechanic Trainees, AAF	Code Rcg Speed, WPM	217	117.4	11.7	.24
Radio Operator Trainees, WAAC	Grades	152	116.2	11.7	.38
Radio Mechanic Trainees, AAF	Grades	419	108.0	13.0	.49
Gunnery Trainees, Armored	Grades	66	120.0	12.1	.50
Field Artillery Trainees, Instrument and Survey	Grades	68	102.7	6.5	.33
Motor Transport Trainees, WAAC	Grades	269	111.4	13.6	.31
Tank Driver Trainees	Ratings	330	87.7	19.5	.16
Truck Driver Trainees	Road Test Ratings	421	95.5	20.1	.13
Bombardier Trainees, AAF	Grades, Academic	40	111.5	18.6	.62
Aircraft Warning Trainees, Plotter-Teller	Grades, Theory	119	107.1	15.6	.73
Aircraft Warning Trainees, Plotter-Teller	Grades, Performance	119	107.1	15.6	.26
Intelligence Trainees, AAF	Grades, Academic	104	118.9	10.6	.51
Photography Trainees, AAF	Grades	431	123.0	11.9	.24
Cryptography Trainees, AAF	Grades, Phase 1	417	129.9	9.7	.31
Weather Observer Trainees, AAF	Grades	1042	130.2	12.5	.43
Officer Candidates, Infantry	Grades, Academic	103	123.0	10.8	.30
Officer Candidates, Ordnance	Grades, Academic	190	128.2	9.6	.41
Officer Candidates, Signal Corps	Grades, Academic	213	128.6	10.1	.36
Officer Candidates, Tank Destroyers	Grades, Academic	52	125.8	10.7	.44
Officer Candidates, Transportation Corps	Grades, Academic	314	126.4	9.8	.38
Officer Candidates, WAAC	Grades, Academic	787	128.4	11.3	.46
Officer Candidates, Infantry	Leadership Ratings	201	122.6	10.8	.12
Officer Candidates, Ordnance	Leadership Ratings	190	128.2	9.6	.09
Officer Candidates, 13 Arms and Services	Success vs. Failure	5186	128.7	10.0	.28*
AST Trainees, basic engineering	Grades, Inorganic Chemistry	222	126.6	7.8	.21
AST Trainees, basic engineering	Grades, Math. (Trig.)	222	126.6	7.8	.16
AST Trainees, personnel psychology	Ranks in Statistics	132	134.2	10.4	.25
AST Trainees, personnel psychology	Ranks in Tests & Measurements	130	134.0	10.3	.29
West Point Cadets, 4th Class	Grades, English†	932	131.3	10.9	.40
West Point Cadets, 4th Class	Grades, Mathematics†	932	131.3	10.9	.43
West Point Cadets, 4th Class	Grades, Military Topography	932	131.3	10.9	.40
West Point Cadets, 4th Class	Grades, Tactics	932	131.3	10.9	.29
West Point Cadets, 4th Class	Grades, French†	167	130.2	11.0	.22
West Point Cadets, 4th Class	Grades, German†	164	132.4	10.9	.20
West Point Cadets, 4th Class	Grades, Spanish†	932	131.3	10.9	.19
West Point Cadets, 4th Class	Grades, Portuguese†	168	130.0	10.3	.12

\* Biserial Correlation.

† First Term.

grades range from .20 to .73. The lower figures are for courses in teletype maintenance (.20), photography (.24) and aircraft welding (.26); the higher values are for the theoretical phases of the plotter-teller course in aircraft warning (.73), and for grades in motor mechanics (.69), bombardier training (.62) and WAAC clerical training (.62). Comparisons are difficult, however, because of the factor of pre-selection. In each of the instances cited where low validity co-



efficients were obtained, the groups had been selected on several factors, including AGCT score. In some of the other groups, yielding higher coefficients, pre-selection was either not so rigorous (aircraft warning trainees) or was not exercised at all (motor mechanics).

In officer candidate schools, AGCT usually correlates with academic grades around .40, despite the rigid selection and restricted range of scores.\* The correlation with leadership ratings, however, is low; consequently the biserial correlation against success or failure (grades plus leadership) is only .28. The test also correlates well with grades in English, mathematics and military topography for the first year at the U. S. Military Academy, but shows little relationship to grades in foreign language courses. As a predictor of grades in the Army Specialized Training Program, however, the AGCT comes off rather badly. This is partly accounted for by the selected character of the population of trainees;† and it is partly a function of the training program itself. Because the various courses and curricula were sharply accelerated, they leaned more heavily than is usual for college courses, perhaps, on a thorough background in high school subjects, and less heavily on abstract ability to learn. A special selection test involving English usage and mathematics of the type normally encountered in secondary school curricula yielded validity coefficients as high as .60-.70 for various AST courses.

For four and a half years, the AGCT-1 was used, in one edition or another, throughout the Army at home and abroad. No exact count of the total number of administrations (both tests and retests) is obtainable. But it is certain that for all of that period, an average of more than four thousand persons were tested each day! In April 1945, the test was superseded, except for certain special purposes, by the Army General Classification Test-3a. While this new test is completely different from the earlier tests, (it is composed of four separately timed and separately scored subjects: Reading and Vocabulary, Arithmetic Computation, Arithmetic Reasoning and Pattern Analysis) the over-all score provides a measure practically identical to the older AGCT-1 score and thus permits continued use of this familiar and valuable index of general learning ability.

\* A score of 110 or better on AGCT is a prerequisite for officer training.

† An AGCT score of 115 or better was required of candidates for the AST Program.



# PSYCHOLOGICAL TEST CONSTRUCTION AND RESEARCH IN THE BUREAU OF NAVAL PERSONNEL:

## MEASUREMENT OF ACHIEVEMENT IN NAVY TRAINING

STAFF OF THE TEST AND RESEARCH SECTION

*Standards and Curriculum Division, Training*

*Bureau of Naval Personnel*

An article describing the program of the Test and Research Section of the Bureau of Naval Personnel appeared in the July 1945 issue of the *Psychological Bulletin*.<sup>\*</sup> As indicated therein, one of the major phases of the test construction and research program in the Bureau of Naval Personnel is the development of standardized achievement examinations and other procedures for measuring attainment of personnel in Navy schools and in other Navy training programs. This article describes in some detail that aspect of the activities of the Test and Research Section.

During 1942 and 1943 an extensive training program was established, including (a) recruit and officer indoctrination schools designed to orient new personnel to the Navy, (b) elementary and advanced training schools in which officers and enlisted personnel learned the many technical knowledges and skills requisite to successful performance in their wartime specialties, and (c) pre-commissioning and shipboard training programs.

### PROBLEMS IN THE MEASUREMENT OF ACHIEVEMENT IN NAVAL TRAINING PROGRAMS

Because of the rapid growth of naval training activities, many problems arose in determining the level of attainment of personnel and the adequacy of training programs. Some of these problems may be stated as follows:

1. Knowledge and skills of graduates of Navy training programs varied markedly. This was due to diversity in curriculum content in the several programs presumably teaching the same subjects, and in competence of instructional and administrative personnel in training programs.
2. Grading practices showed conspicuous variation with respect to the factors used in determining school grades and to other standards of attainment.
3. In many cases locally devised examinations failed to cover the minimum essentials of the curriculum.
4. There was no consistent procedure for routine administration of achievement tests; in many training activities they were irregularly and infrequently administered.

As these and similar problems multiplied, it became evident that a program of standardized evaluative procedures could be of value in improving training by

1. Providing a common yardstick for measuring the attainment of graduates in two or more schools in which the same type of instruction was offered.
2. Promoting fairness and uniformity in assigning grades of graduates.

<sup>\*</sup> Psychological Testing and Research in the Bureau of Naval Personnel: Work of the Navy's Test and Research Section, *Psychol. Bull.*, 1945, 42, 433-444.



3. Focusing attention of instructors on the essential knowledges and skills which should be mastered by trainees.

4. Motivating and pointing the way for improvement of instruction.

5. Providing a basis for determining the effectiveness of instruction in different schools of the same type.

Late in 1943, upon the request of the Quality Control Division\* of the Bureau of Naval Personnel, a program of developing standardized evaluative procedures was added to the existing test development program. Specifically the mission with respect to the development and use of evaluative procedures was threefold:

1. To develop examinations for officer and enlisted training programs.
2. To recommend policies regarding the use of tests in evaluating training.
3. To provide technical assistance and advice in solving problems involving the measurement of achievement in Navy schools.

#### PROGRAMS FOR WHICH MATERIALS HAVE BEEN DEVELOPED

Between January 1944 and October 1945 achievement examinations have been developed for use in the following types of training programs: (1) officer training, (2) recruit training, (3) elementary and advanced training schools for enlisted personnel, and (4) shipboard and shore station training. A description of types of examinations for each of these training programs follows.†

##### *Officer Training Programs*

Achievement examinations have been constructed to measure the attainment of graduates of Naval Reserve Midshipmen Schools and of Naval Reserve Officer Training Corps Units. These examinations cover seamanship, damage control, navigation, ordnance and gunnery, communication, recognition, naval administration, and naval law.

Officer Pre-Radar Achievement Examinations are used to measure the attainment of officers being trained as electronics engineers and to assist in selection of such personnel for advanced technical training. Examinations have also been developed to determine proficiency of officers upon completion of tactical radar training.

##### *Enlisted Training Programs*

*Recruit training.* Standardized recruit achievement examinations are administered to recruits upon completion of training. The examinations cover general information about the Navy and its organization, seamanship, military training, ordnance and gunnery, fire fighting, gas warfare defense, recognition, lookout, telephone talker, and first aid and personal hygiene.

*School training.* Written final achievement examinations have been prepared for measuring the attainment of enlisted personnel in fifteen types of elementary and advanced naval training schools. In addition to written exam-

\* The Quality Control Division is charged with maintaining the "quality" of naval training.

† A complete list of achievement examination materials developed through October 1945 will be found at the end of this report. In this program the Bureau of Naval Personnel has been materially assisted by projects of the National Defense Research Committee.



inations, performance tests and identification tests have been developed for programs where such instruments were considered to be of especial utility.

*Shipboard and shore station training.* A comprehensive series of "Advancement Examinations" has been developed for use by examining boards on ships and stations in determining the eligibility of enlisted personnel for promotion to various pay grades in petty officer status. These are pools of items designed for use in locally developed tests in order to establish uniformity in promotion standards. In all, four volumes, totalling some 30,000 test items on 46 types of Navy jobs, have been published and distributed to ships and stations. The test items in each book are organized into examinations for the various ratings. With each rating items are geared in difficulty to the level of technical competence required for advancement to third, second, first class, and chief petty officer status.

*Special Training Programs.* Constructed for use in the Navy Special Training Program, Reading Achievement Examinations are designed to measure the functional literacy of those persons who, because they could not read or write, were given a special twelve weeks' course in language development. These examinations are constructed to measure levels of reading ability between complete illiteracy and sixth grade, since the standard of literacy set by the Navy is ability to read at the fifth grade level. They are specific in character, involving skill in reading signs, notices, simple instructions, elementary technical materials, and narrative. Both general vocabulary and specialized naval terminology and idiom are taken into consideration. Examinations have been standardized by comparison with data from the Gates Reading Survey and the Sangren-Woody Reading Test; all tests were administered to the same group of approximately four hundred trainees. A conversion table for translating raw scores into reading grades has been developed.

### TYPES OF TESTS DEVELOPED

Three general types of measuring instruments have been constructed for use in measuring outcomes of instruction in naval training programs: paper and pencil examinations, identification tests, and performance tests. A brief description of each type follows.

*Pencil and Paper Examinations.* These examinations consist of multiple choice test items designed to measure knowledge essential to performance of technical duties. Most of them involve problems in which operational knowledge is required of the trainee. Insofar as possible, liberal use has been made in these tests of photographs of equipment, diagrams, and other illustrative materials.

*Identification Tests.* These tests have been developed to test the trainee's acquaintance with the basic tools and equipment of his rating. Here use has been made of actual equipment to measure the extent of recognition of separate parts of machinery and knowledge of the part's function in its total mechanism. For example, for Gunner's Mates school, identification tests have been developed which require the trainee to name and locate essential parts of five commonly used types of guns.

*Performance Tests.* Because proficiency in the Navy billet requires not only a knowledge of essential facts and principles but also skill in the application of knowledge, special attention has been given to the objective measurement of performance. Accordingly, performance tests have been devised to determine how well trainees could apply skills, learned in training, to the assembly and



disassembly of guns, the starting and stopping of Diesel engines, the sending and receiving of semaphore messages, and the locating and correcting of casualties to engineering equipment.

### OTHER SERVICES

*Manual on Constructing and Using Achievement Tests.* In recognition of the need on the part of instructors in Navy schools for reliable and usable information on the preparation of examinations for local use, a manual "Constructing and Using Achievement Tests" has been prepared. The basic techniques of test construction are presented in non-technical language and in concise form. Four major sections deal with performance tests, written tests, test administration, and scoring and interpretation of tests. Particular emphasis is placed upon the local development of performance tests. Instructors are encouraged to consider such basic questions as the following:

1. What are the essential skills and information the men must have to do the job for which they are being trained?
2. What are the most significant aspects of performance to be tested?
3. What criteria of performance will be used to indicate good or poor performance (quality of finished product, skill and accuracy of operations, speed, identification, etc.)?
4. What is the most effective, consistent, and economical way to administer the test?

Examples of satisfactory performance test situations, together with complete directions for setting up equipment, administration, and scoring are also provided.

In the section on written tests, the more common types of achievement examination items are discussed. Fundamental rules and principles are illustrated with test items as in the following example.

### AVOID ASKING QUESTIONS ON TRIVIAL DETAILS AND USELESS SUBJECTS

#### *Useful knowledge:*

Hydraulic systems using mineral base fluids are flushed and cleaned with

1. soap solution.
2. kerosene.
3. carbon tetrachloride.
4. alcohol.
5. caustic soda solution.

#### *Trivial. (Not much practical value in knowing this):*

The term which best describes the science of using ordnance material is

1. ballistics.
2. cannonade.
3. boresighting.
4. gunnery.
5. tactics.

Attention is called to "good" and "poor" testing situations and the need for uniformity of procedures in testing is emphasized.

The section on scoring and interpretation of test scores describes the use and preparation of answer keys of various types and deals with the translation of test scores into "grades" through a simple linear conversion procedure. A simplified method for analysis of test items as a means of directing attention to areas of instructional deficiencies is also included.

*Analyses of Distributions of School Grades.* One of the routine activities of the Test and Research Section has been periodic analyses of grading in naval training schools. Records, by classes, of the grades assigned to graduates are sent in by the schools. Distributions of these grades are made and basic statis-



tics computed, following which a report is made to each school. This report consists of the distributions of grades in each class, with comments on the apparent satisfactoriness of the distributions and with suggestions for modification in grading standards.

### PROCEDURES FOLLOWED IN TEST CONSTRUCTION

The standardized examinations produced in the Test and Research Section represent a fusion of the ideas of test technicians, subject matter instructors, and training officers in schools and other programs. The process of constructing an examination is best described as a cooperative undertaking in which the following techniques are employed:

*Preliminary Stages.* In determining the programs for which achievement examination materials are to be prepared, both the technical level and the size of the training program are taken into consideration. Tests are developed for the more important and technical programs and those which include the largest number of trainees. Once it has been decided to develop materials for Electrical schools, for example, the test technician assigned to the project makes a preliminary study of the curriculum at the schools and confers with subject matter specialists in Billet Analysis Section and Quality Control Division of the Bureau to lay out the general plan of the examination and to determine the appropriate form.

*Determination of Content.* If a standard curriculum has been prepared, it is taken as the basis for the content of the examination. Otherwise, the curricula of the several schools are compared and analyzed so that the examination will reflect the major objectives and content of training common to the type of school for which the examination is being developed.

The test technician must also become familiar with instructional practices in the school. To this end he visits several of the schools. Here, conferences are held with instructors and training officers, where the curriculum and its objectives are discussed point by point, raising the following questions:

1. Is this point essential for successful performance in the job?
2. What is taught with respect to this point?
3. How much will trainees be expected to know regarding this point upon graduation from the school?

It is equally important, especially in developing performance test situations, to know what equipment is available in the schools and to plan for its use in periodic testing.

*Constructing the Preliminary Form of the Examination.* Frequently, a well qualified instructor in the special field is ordered to the Bureau of Naval Personnel to assist in developing the first draft of an examination. Test items are devised to sample the minimum essentials in knowledges and skills in proportion to the amount of instructional time prescribed for each. Objectivity in test items is emphasized and every effort is made to avoid ambiguity and to use terminology which is familiar to trainees. After a large number of tentative items has been developed, the test technician again confers with instructors and training officers. Together they review each test item in light of the following criteria:

1. Does this item cover a knowledge or skill essential in performance?
2. Does this item involve subject matter taught in the course?
3. Is this item one which trainees can understand?



Items which survive the criticism of instructors and other experts are assembled in preliminary test form. Usually, two or more subject matter specialists are then asked to take the test and to make out answer keys. These keys are checked against each other and against the answers indicated by the test maker. The preliminary form of the test is then mimeographed and administered to several groups of trainees.

*Determining Statistical Validity.* After the answer sheets used in the preliminary administration of the test have been scored, the difficulty index and discriminative value of each item in the test are computed. The usual index of discriminative value is the estimated biserial correlation based on the respective proportions of correct responses found in the papers of the top and bottom 27 per cent of the population tested as determined by the total test scores.

*Constructing the Final Form of the Examination.* Based on an analysis of items in the preliminary form of the test, one or more final forms of the examination are constructed consisting of the most discriminating questions with optimum range of difficulty.

*Routine Administration of the Examination.* The first administration of a final form of an examination is usually supervised by the officer who was responsible for its construction. He is thus enabled to refine the directions for routine administration and to become acquainted with any special circumstances which should be considered in interpreting test results. A manual of directions for routine administration of the examination is written, and conversion tables are prepared for use in translating trainees' raw scores to achievement examination grades. Thereafter, administration of the examination in each school is under the supervision of an Instructor Training Officer assigned for this purpose by the training school command or by the Naval District in which the school is located. This officer is also responsible for maintaining the security of examination materials, for supervising scoring, for preparing a summary report on the distribution of examination grades, and for returning these data, together with the answer sheets, to the Bureau of Naval Personnel.

## OUTCOMES OF THE ACHIEVEMENT EXAMINATION PROGRAM

The contributions of the achievement testing program in Navy training programs fall into two major categories. First, the introduction of objective and accurate measuring instruments has focused attention upon grading techniques and has increased the usability of evaluations assigned to trainees. Second, the use of standardized examinations has been instrumental in improving instruction and learning.

### *Effect on Grading and Marking Techniques*

Prior to the development of standardized achievement tests for Navy schools, grades were highly subjective and were frequently based upon varying standards and criteria of achievement. Comparability of trainee achievement from school to school, or even from class to class within the same school, was difficult in the absence of a common scale.

*Standardization of School Grades.* The use of standardized achievement examinations in determination of school grades has led to greater usefulness of these grades in placing graduates in shipboard billets, in comparing naval training programs for supervisory purposes, and in providing more adequate criterion data for research in selection and training. Statistical reliability is in some degree an index of the objectivity of measurement. Reliabilities of selected tests are shown in Table I.



TABLE I

RELIABILITIES OF REPRESENTATIVE FINAL ACHIEVEMENT EXAMINATIONS  
FOR ENLISTED TRAINING PROGRAMS

<i>Training Programs</i>	<i>Number of Forms</i>	<i>Number of Items per Form</i>	<i>Range of Obtained Reliabilities*</i>
Recruit Training	3	215-300	.88-.93†
Special Training—Reading	2	85	.96
NTSch (Basic Engineering)	4	150	.83-.88†
NTSch (Diesel)	4	150	.83-.91†
NTSch (Gyro Compass)	2	150	.77-.86
NTSch (Electrical)	6	150	.82-.91†
NTSch (Elementary Electricity and Radio Materiel)	6	120-130	.84-.88
NTSch (Fire Controlmen)	2	150	.84-.88
NTSch (Gunner's Mates)	2	150	.84-.90†
NTSch (Quartermaster)	2	150	.85-.88
NTSch (Signal)	4	150	.86-.92†
NTSch (Radio)	2	150	.75-.76
NTSch (Torpedomen)	4	125-200	.88-.94†
NTSch (Storekeeper)	5	200	.86-.90†
NTSch (Yeomen)	5	150-160	.74-.93†

\* Shows range of reliabilities obtained when coefficients were computed separately for each of a number of samples.

† Indicates odd-even or split-half reliability. Others were estimated by the Kuder-Richardson Formula #21.

An example of the effects of achievement examinations on grading and marking techniques followed the introduction of performance tests in a school in which trainees were taught mechanical and electrical duties. In this school, as is frequently the case in shop training, the abilities of trainees were being judged primarily by the instructors evaluating materials turned out as shop projects. Standards of evaluation applied by different instructors varied widely. Their ratings showed little evidence of satisfactory discrimination, being grouped closely about the mean. In the same school, in a portion of the curriculum dealing with the fundamental processes of arithmetic required in mechanical and electrical work, a locally prepared test was administered. The dispersion of scores on this test was comparatively large. While it was the intention of the school that marks in various phases of the course should contribute equally to the composite final grade, quite an opposite effect was obtained when shop marks and arithmetic grades were combined, for the latter marks affected disproportionately the overall grades for the course. On the introduction of carefully developed performance tests in various aspects of shop work and the use of objective and reliable measuring methods, adequate variability and greater validity for the shop grades were attained. When these shop grades were then combined with grades in other phases of the curriculum, a more realistic and valid evaluation of trainee achievement was obtained.

It is also interesting to note the effect of improved grading in this school as it was reflected in the usefulness of school grades as a criterion in evaluating selection tests. Whereas a selection test in arithmetical reasoning had been the best predictor of success in the school when the arithmetic test produced wide dispersion and shop grades were concentrated about the mean, a test requiring mechanical knowledge became the most important element of a selection bat-



tery after objective measures of shop work were introduced into the criterion.

*Improvement of locally developed tests.* The cooperative nature of test construction has motivated instructors to make improvements in their own tests. In some schools, seminars in test construction have been held with the cooperation of officers from the Test and Research Section. The manual, *Constructing and Using Achievement Tests*, has been used extensively in Navy schools. Accordingly, instructors have become better acquainted with factors entering into the objective measurement of instructional outcome.

Finally, reports showing trends in scores of trainees on standardized achievement tests are forwarded periodically from the Test and Research Section to the Quality Control Division of the Bureau of Naval Personnel. Similar reports pertaining to results of specific tests are sent to Instructor Training Officers in schools in which those tests are used. These reports, sometimes supplemented by detailed test item analyses, give reliable evidence to officers in Quality Control Division and to Instructor Training Officers, of the extent to which prescribed curricula are being followed. These data also furnish reliable information to help these same officers in maintaining a uniform and high quality of training.

### *Effect on Instruction and Learning*

There is considerable evidence that achievement testing has made a definite contribution to the improvement of instruction and learning in Navy schools. First, the fact that instructors in various schools have cooperated with test technicians in constructing examinations has led to an increased interest in materials being taught and in the manner in which these materials were presented. For example, in constructing an examination, the necessity for clarifying major objectives has focused the attention of the subject matter instructors, who worked with test technicians, on the more important abilities and knowledge to be developed during training.

Again, examination results have been used frequently by instructor training officers to point out areas of inadequate instruction. Subsequently, subject matter instructors have been motivated to improve their instructional techniques in those areas of a curriculum where test results revealed learning deficiencies.

This is well illustrated by a condition which has been observed in several schools, in which instructors have professed assurance of the satisfactory manner in which trainees have learned a required skill or knowledge. After observing trainee attainments under controlled testing conditions, these same instructors have become aware of many learning deficiencies and have turned their attention to improving the learning situation. In one notable instance, almost none of the trainees were able to complete required operations upon the first administration of a performance test. After performance tests had been used for some time in this school, it became necessary to revise the test norms drastically in order to make them applicable. For example, the reduction of average time required by trainees in one performance test operation was greater than 50%.

While it is impossible to indicate precisely the relative contributions of improved instruction on the part of teachers and improved learning on the part of trainees, there is reason to believe that improvement in the final product of Navy schools has been partially the result of increased trainee motivation. For example, standardized examinations and grading procedures tend to discourage malingering among trainees. Frequent administration of performance tests and pencil and paper examinations provides a series of challenges to students.



Finally, there is evidence that trainees are motivated to more thorough learning by knowing that testing in the school will be comprehensive, systematic, and objective.

### ACHIEVEMENT EXAMINATIONS AND MATERIALS FOR NAVY TRAINING PROGRAMS

<i>Name of Test</i>	<i>Num- ber of Tests</i>	<i>Number of Forms of Each Test</i>
Naval Reserve Midshipmen's Schools' (Deck)		
Standardized Written Examinations.....	4	1
Naval Reserve Officer Training Corps		
Standardized Written Examinations.....	11	1
Pre-Radar Final Achievement Examinations.....	1	4
CIC Final Achievement Examinations (Tactical Radar)...	1	2
Recruit Training:		
Written Final Achievement Examinations.....	1	3
Basic Engineering:		
Written Final Achievement Examinations.....	1	4
Performance Tests.....	15	1
Diesel:		
Written Final Achievement Examinations.....	1	4
Performance Tests.....	1	1
Electrical:		
Written Final Achievement Examinations.....	1	6
Performance Tests.....	29	1
Fire Controlmen:		
Written Final Achievement Examinations.....	1	2
Gunner's Mates:		
Written Final Achievement Examinations.....	1	6
Identification Tests.....	$\left\{ \begin{array}{l} 5 \\ 1 \end{array} \right.$	$\left\{ \begin{array}{l} 1 \\ 2 \end{array} \right.$
Performance Tests.....	$\left\{ \begin{array}{l} 5 \\ 1 \end{array} \right.$	$\left\{ \begin{array}{l} 1 \\ 2 \end{array} \right.$
Gyro Compass:		
Written Final Achievement Examinations.....	1	2
Quartermaster:		
Written Final Achievement Examinations.....	1	2
Radar Operators:		
Written Final Achievement Examinations.....	3	2
Performance Tests.....	3	1
Radio		
Written Final Achievement Examinations.....	3	1
Performance Tests.....	$\left\{ \begin{array}{l} 1 \\ 1 \end{array} \right.$	$\left\{ \begin{array}{l} 4 \\ 8 \end{array} \right.$
Radio Materiel (Pre-Radio Materiel):		
Written Achievement Examinations.....	1	6
Radio Materiel (Elementary Electricity and Radio Materiel):		
Written Final Achievement Examinations.....	1	6



ACHIEVEMENT EXAMINATIONS AND MATERIALS FOR  
NAVY TRAINING PROGRAMS  
(Continued)

<i>Name of Test</i>	<i>Num- ber of Tests</i>	<i>Number of Forms of Each Test</i>
Signal:		
Written Final Achievement Examinations.....	1	4
Spelling Achievement Tests.....	1	2
Performance Tests.....	6	2
Storekeepers:		
Written Final Achievement Examinations.....	1	5
Torpedomen:		
Written Final Achievement Examinations.....	1	4
Performance Tests.....	59	1
Yeomen:		
Written Final Achievement Examinations.....	1	5
Performance Tests.....	2	3
Check List for Correct Handling of Sound-Powered Tele- phone.....	1	1
Lookout Final Achievement Examinations.....	1	2
Reading Classification Examinations.....	1	2
Reading Final Achievement Examinations.....	1	2
Telephone Talker Final Achievement Examinations.....	1	2

ADVANCEMENT EXAMINATIONS

<i>Name of Test</i>	<i>Number of Tests</i>
Examinations for Aviation Ratings.....	60
Advancement Examinations, Book I (Seaman, Special, and Commissary Ratings).....	56
Advancement Examinations, Book II (Artificer Ratings).....	53
Advancement Examinations, Book III (Aviation Ratings).....	46

TECHNICAL MANUALS

Constructing and Using Achievement Tests (A Guide for Navy Instructors)
Insert A: Example for Naval Training School (Gunner's Mates)
Insert B: Example for Naval Training School (Electrical)



## A SPEECH PATHOLOGY PROGRAM FOR NAVAL HOSPITALS\*

IRIS STEVENSON, LT. (J.G.) H(W) USNR  
&

A. ELAINE MIKALSON, ENS. H(W) USNR

The increasing incidence in Naval hospitals of casualties exhibiting speech disorders called the attention of the Bureau of Medicine and Surgery to the need for some supplementary program of specific speech correction. Such cases of speech disorder fall into three categories:

- a. Those disorders of neuropathic origin, particularly the aphasias.
- b. Disorders resulting from specific damage to the speech apparatus itself.
- c. Psychogenic disorders resulting from conditions incurred in service.

Since the most prevalent cases, those of the aphasias and the articulatory difficulties resulting from damage to the speech apparatus, tend naturally to be gathered in those hospitals designated as centers for neurosurgery and plastic surgery, it was decided to set up a program of speech therapy in each of these centers. A trained speech pathologist was assigned to the staff of each of these hospitals. These pathologists were obtained from the trained speech specialists already commissioned in the Naval service but assigned to billets where their specific speech training was not being used. It was considered that this policy would result in the most economical use of Naval manpower.

Such speech pathologists assumed their duties under a broad directive which allowed them leeway for individual professional initiative and ingenuity. In the words of the Surgeon General's letter establishing this program

While cognizant of the common goal of all speech correction, the Bureau is aware of the varying nature of specific therapeutic procedures by which this common goal may be reached. Speech pathologists assigned to hospitals will be trained personnel with sufficient professional training and experience to enable them to evolve a program best fitted to the specific needs of each hospital.

The goal of the program is stated later in the same letter:

It is the desire of the Bureau that speech correction have as its aim restoring the individual patient's speech function to such a level as will enable him to carry on the ordinary activities of everyday life, and that it be considered an integral part of his treatment.

The speech pathologists assigned to this program are designated as H(S) and H(W) officers and placed for administrative purposes under the joint cognizance of the Rehabilitation Branch and the Neuropsychiatric Branch of the Bureau of Medicine and Surgery. In the field the speech pathologist is assigned to the Neuropsychiatric Service of his hospital under the clinical psychology program. Care is taken, however, to separate the actual working of the speech program as much as possible from the Neuropsychiatric Service in order to avoid any unpleasant connotations. The individual patients requiring speech

\* The opinions or assertions contained herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.



correction are not assigned to the Neuropsychiatric Service but are kept on the clinical service appropriate for the treatment of their basic condition.

Such a program of speech correction has been in operation for several months in a large Naval hospital and has proven eminently successful. A typical census of patients undergoing speech treatment at any one time at this hospital reveals seven aphasic cases, five cases of articulatory difficulties and three cases of psychogenic disorders. The speech training is integrated with the patient's complete therapeutic program, and direct contact is maintained with other services of the hospital by means of consultations between the speech therapist and officers of other departments in which the patient is receiving treatment. Treatment is continued as long as necessary or until the patient is discharged from the hospital.

The method used at this Naval hospital is one of individual therapy supplemented by participation in group meetings as soon as the patient has progressed to the point where he can benefit from working in a group. Patients report on an appointment schedule for individual therapy, the amount of time given to each depending upon the urgency of his need. The more acute aphasic patients report every day, sometimes two or three times daily. Others report only two or three times a week, but are given speech assignments to be carried out in their wards. Bed patients are visited by the therapist.

The weekly group meeting is considered one of the most essential phases of the speech rehabilitation program. Real life situations are acted out, such as introducing a friend or purchasing an article at a store. Telephone calls may be made by those who avoid phone calls. Some of the speech exercises are pantomimes of some situation which the patients may have encountered. Frequently current affairs are discussed. One patient is chosen a week in advance to act as chairman of the meeting. He selects the questions and leads the discussion.

Oftentimes, though patients have regained adequate speech, they avoid entering speech situations. For this reason they are sent on speech assignments, usually within the hospital. An aphasic may be asked to telephone the barber shop and ask what time it closes, or a stutterer may be sent out to ask three persons the location of the Record Office. Reports on these assignments are required, and the patient's psychological reaction to his defect and his adjustment to it are discussed as much as the actual speech production. Occasionally the speech therapist accompanies a group of ambulatory patients to a nearby town, where the patients carry out individual assignments in the stores. These trips do much to establish confidence.

Progress phonograph records are kept on the individual patient. This includes the initial interview, articulation tests, and frequently oral sections of the Cheshier Aphasia Test. The phonograph records serve as motivation to the patients and also as an encouraging indication of progress. The mirrorphone has been found useful for day-to-day therapy in auditory discrimination and stimulation. In addition to this, a large mirror is used for illustration of tongue and lip positions and coordination exercises. The motion picture laboratory at the hospital cooperates with the speech therapy department in making movies of those patients who have facial reactions to be overcome. These pictures aid the patient in attaining an objective approach to his problem.

The following brief case histories illustrate the type of speech problem which is most often seen at this hospital.

*Case No. 1.* This man suffered a loss of symbolic speech as a result of encephalitis, left cerebral thrombosis. He was able to repeat words after they



were spoken aloud to him, but could not associate words with objects. In addition to his loss of speech he had suffered losses in educational skills, and was referred to the Educational Services Department for educational retraining. After three months of speech therapy he regained nearly seventy per cent of symbolic speech and after six months of additional therapy was considered capable of continuing alone. He has recently been discharged from the Naval service with the prognosis good for a satisfactory adjustment to civilian life.

*Case No. 2.* This man received a cranial injury during combat aboard ship which resulted in a speech aphasia. His speech was characterized by blocks lasting as long as seventeen seconds. He evidenced great emotional reaction to these situations and avoided all social contacts, even refusing to talk to other patients in his ward. He responded quickly to speech therapy, began taking an active part in group meetings and finally went on speech assignments. Whereas he had been asocial and silent, he now became the center of social activity in the ward. Reports since he has been discharged to civilian life indicate a satisfactory adjustment.

*Case No. 3.* A shrapnel wound, left hemisphere, resulted in a total loss of coordinated speech in this patient. At the time of referral he could produce only three sounds and these, with gestures, were his only means of communication. By the time speech training was begun he had developed a number of frustration reactions to his lack of speech. Since learning his first words, he has evidenced a more adult adjustment and some short sentences have become habitual. He has learned to produce nearly all sounds, although he does not spontaneously arrange these sounds in word configurations. While he is progressing rapidly, he needs continued training in this process.

*Case No. 4.* This patient on the Neuropsychiatric Service was referred to the speech therapist because of his stuttering. He had a history of childhood stuttering but had evidenced no difficulty during his Naval service until after extended sea duty and combat. He manifested secondary symptoms of facial reactions and found it very difficult to read aloud. Through negative practice he was soon able to control his secondary reactions and it gradually became possible for him to enter situations which he previously had feared and avoided. He improved to the extent that he was returned to duty.



## A SOCIAL THERAPY PROGRAM FOR NEUROPSYCHIATRY IN A GENERAL HOSPITAL\*

ELIAS KATZ, 2d Lt. MAC

The general aims of a Social Therapy Program for psychiatric patients should be (1) to accelerate their return to duty, and (2) to effect maximum hospitalization prior to discharge of those no longer capable of military service.

In order to achieve these aims, an atmosphere of recovery or hope of recovery has been distributed throughout this program. "Psychological climate" produces acceleration of all forms of therapy. This attitude of receptivity to recovery has been encouraged by morale-building activities such as the granting of passes, liberal furloughs, many privileges and rich entertainment opportunities. From the time the newly admitted patient is given his first orientation talk until he leaves the hospital, he is acquainted with the possibility of amelioration of his condition, and given the assurance of ultimate recovery.

This program for both Open Ward and Closed Ward patients has been set up to include and integrate all the elements of mass, small group, and individual psychotherapy.

### MASS PSYCHOTHERAPY

Soon after the first neuropsychiatric patients arrived at this hospital in the Spring of 1944, it was realized that to achieve the objectives of the Social Therapy program it would be necessary to introduce mass therapy techniques, since there was a shortage of psychiatrists, psychologists, social case workers, nurses and enlisted personnel. Some of the group activities engaged in at that time included outdoor ball playing for Closed Ward patients; and motion picture programs were arranged in the Red Cross Recreational Hall for Open Ward patients. Activities were limited to morning sessions, and no careful check of attendance was made. Although the rate of recovery seemed satisfactory with this limited program, it was felt that better results would be obtained through the development of a more comprehensive and more adequately controlled program of mass activities.

Therefore, activities were added to the program, including extensive physical reconditioning and occupational therapy for all patients; industrial therapy, fatigue details, educational classes, and the publishing of a weekly newspaper for Open Ward patients. Attendance was controlled; an afternoon program was added, and better discipline was secured. A growing emphasis on patient participation drew more and more of them into the varied activities. As much as possible, the facilities made available through the Reconditioning Service of the hospital, as well as by such agencies as Special Services, Red Cross, and outside agencies, were utilized.

Each Monday morning an orientation talk is given to both Open and Closed Ward patients, telling them about the program of the week. Once a week a psychotherapy talk is presented to Open Ward patients, in which some insight is given into the mechanisms of adjustment and causes of breakdowns. As much as possible this therapy program is tied in with individual and group therapy programs.

\* From the Neuropsychiatry Section of the Medical Service, Crile General Hospital, Cleveland, Ohio.



## GROUP PSYCHOTHERAPY

Small group psychotherapy has been recognized as a valuable means for encouraging the development of morale and for supportive therapy. Security, which was once based in the man's military unit, having been lost by separation and hospitalization, is now provided by the formation of a new congenial group, each member of which has suffered similar conflicts. In many instances the conflict between the basic need for social approval of a group, and the need for self-preservation has been the precipitating cause of a psychoneurotic breakdown.

These sessions have provided opportunity for ventilation of tensions which have been dangerously near the explosive level. Insight is provided by the therapist when it is felt that such understanding will be of value to any member of the group.

The number of patients in each group is limited to ten. The period allowed is roughly one month, with two hourly sessions per week. In general, the meetings start with a period of orientation, subsequent sessions being devoted to personal problems and to developing suggestions for helping the individual meet his difficulties.

Psychodrama has also been used as a form of group psychotherapy. In this type of therapy, a situation which is troubling the individual is dramatized. This might be the patient's difficulty in meeting his friends, or his inability to get along with officers, or what he must do in applying for a job. The patient then acts out the situation, gaining assistance and suggestions from the group whenever it is clear that he cannot work his way through to a suitable solution.

## INDIVIDUAL PSYCHOTHERAPY

Individual psychotherapy is administered through informal interviews on request of the patient, or initiated by the psychiatrist or the psychologist. In many cases, the aim is to provide supportive therapy and to instill reassurance. Where some measure of insight will be helpful to the patient, it may be given by the therapist.

Narco-synthesis is undertaken by the psychiatrist in those cases where the patient is not accessible in any other way. Such interviews often bring to the surface elements of the patient's background or traumatic experience which make it possible to determine the nature of the difficulty and to proceed to further treatment. However, it must be emphasized that long-term therapy is not attempted, as that is not the function of the therapy program at this hospital.

Patients who do not participate in the mass therapy program are interviewed, and an attempt is made to determine the source of their difficulty. Individual allowances may be made. In some instances patients on Open Wards may be returned to Closed Wards for further treatment. Some of the patients have been excused from the regular activities to do special work in occupational therapy, or to do jobs around the hospital, such as assignment to clerical work or to necessary cleaning details on the wards.

## OPEN WARD PROGRAM

1. *Orientation.*

a. As soon as possible after admission to the Neuropsychiatry Section, patients are given an orientation talk. In this talk, information is presented about the purposes of



the Neuropsychiatry Section, the liberal pass policy, privileges available, and the patient's responsibilities in connection with the program. An opportunity is afforded to ask questions. It has been found that this introduction creates in many patients a favorable impression which has a valuable long-range effect on morale and subsequent recovery.

b. Each week, patients are apprized of the activities of the week, including special events, and their responsibilities in cooperating with the Social Therapy program.

### 2. *Physical Reconditioning.*

a. *Calisthenics* are given twice daily at 0900 and 1530 hours under the supervision of a Physical Reconditioning Officer. However, patients are used whenever possible to direct exercises and organize games.

b. *Kelly Drill*. "Kelly says!" and men follow. Prizes are given to the winners. This is administered by the Physical Reconditioning Officer. When weather permits, open order drill is also given.

c. *Gymnasium*. Supervised game periods include ping pong, miniature bowling, basketball, baseball, hand ball, volley ball, and boxing.

### 3. *Occupational Therapy.*

For Psychiatric patients the Occupational Therapy Shop is primarily recreational and diversional. Here the activities engaged in may be printing, silk screen process, leather work (wallets, belts, slippers), loom work (small, medium, large), wood work (models, boxes, carving), metal work (bracelets, jewelry), and plastics (boxes, book ends, frames).

### 4. *Industrial Therapy.*

a. An *industrial* unit has been set up in the hospital under Reconditioning Service, in which patients may engage in work directly contributing to the war effort. Our patients do not actually operate the machines but are being used primarily for distributing and checking the work to the wards on other Services.

b. *Special Projects*. From time to time special industrial therapy projects are set up and carried out by psychiatric patients. An example is the assembling and mailing of a poster with the famous photograph of the Marines raising the flag on Mt. Suribachi on Iwo Jima. This poster was sent to persons who bought bonds in the Seventh War Loan Drive.

c. *Work Around the Hospital*. Every effort is being made to place patients in work around the hospital. To date, placements have been made in the Post Theatre, Publications, Red Cross, and Motor Pool.

d. *Embossograph Machine*. Recently the hospital embossograph machine was assigned to the Neuropsychiatry Section by the Post Engineer for operation by psychiatric patients. The work involves the printing of necessary signs for the hospital. Both the hospital and participating patients have profited.

### 5. *Educational Reconditioning.*

a. *Nature talks* are given by representatives of the Natural History Museum in Cleveland.

b. *GI Roundtable* discussions have been conducted by officer patients assigned from the Reconditioning Service. These talks are given at regular intervals and maximum effort is made to gain participation among the patients.

c. *Movies*. GI movies and training films are shown regularly. An effort is made to show films which have instructional values.



d. *Panel Discussions.* An extremely popular series of weekly presentations of current topics was broadcast over the hospital radio system. The topics included the Army and its components, labor problems, and postwar employment opportunities.

e. *Educational.* Classes are conducted by the Reconditioning Service in photography, typing, motor mechanics, mechanical drawing, sketching, and watch repair. USAFI (United States Armed Forces Institute) self-study courses are also available. From time to time individuals or organizations have presented special lectures and educational programs. For example, a graphologist presented an interpretation of the men's handwriting.

#### 6. *Recreational and Diversional.*

a. *Dancing* classes are held weekly through the voluntary cooperation of several Arthur Murray dancing teachers. These are extremely popular.

b. *Music* lessons are given to individual patients through the cooperation of the Red Cross Music Staff.

c. *Group Singing.* At least one session during the week is devoted to group singing. This is conducted either by outside guests or by the Red Cross Staff.

d. *Sketching.* A member of the Staff of the Cleveland Art Institute holds daily sketching classes in the Red Cross Building.

e. *Free Play Periods.* Once a week a free play period is given in which the patients may participate in card games, ping pong, miniature bowling, and billiards.

f. *Entertainment and Special Features.* Through the courtesy of the USO, Red Cross, and Special Services, entertainment programs are given, usually in the afternoons, which the patients are encouraged to attend.

g. *Baseball.* Since the good weather has arrived patients have availed themselves of the opportunity to attend outdoor big league baseball games in Cleveland.

h. *Library.* Patients are liberal users of our excellent Library, particularly for study and work on USAFI courses.

i. *Patient Band.* The Red Cross furnished instruments for a well organized band. In spite of frequent turnover of patients, this band has performed splendidly for patients on various wards, and has furnished music for the dancing classes.

j. *Debates.* Patient debates and discussions are encouraged as a means of venting resentments and of bringing "gripes" to the surface. Talented speakers have been uncovered during the course of these debates.

#### 7. *Fatigue Details.*

a. *Ward policing* is done by the patients, who are selected by the ward master. This duty may excuse them from attending other Social Therapy classes.

b. *Fatigue details* are sometimes assigned to patients for duty on other wards, usually on a voluntary basis. There has been no difficulty in getting volunteers for this type of work.

#### 8. *Visitors.*

Utmost freedom is given to patients in seeing visitors who may come afternoons and evenings. It is felt that this has valuable therapeutic advantages.

#### 9. *Passes and Furloughs.*

A most liberal pass and furlough policy has been established by order of the Commanding Officer. Men may be granted passes each day after 1630 hours and week-end passes from 1200 hours Friday until 1200 hours Monday. Emergency furloughs are granted after proper investigation by the Red Cross.



10. *Newspaper.*

A newspaper, published weekly, has served to bring together patients who are interested in this type of work, and they seem to have gained much from their participation. It is distributed to all patients in the Open and Closed Wards, and contributions to it are encouraged.

11. *Educational and Vocational Guidance.*

Although short of personnel, some attempt is being made for guidance and training of those patients who are in need of it. In some cases recommendations have included study of USAFI courses, and assistance for accreditation, leading to completion of high school or college requirements.

## CLOSED WARD PROGRAM

In general many of the activities mentioned in the Open Ward Social Therapy program are the same for the Closed Wards. For this reason it will not be necessary to elaborate.

1. *Orientation.*

Wherever possible, the Closed Ward patients are oriented to the possibility of recovery.

2. *Physical Reconditioning.*

a. *Calisthenics*—given twice daily.

b. *Gymnasium*—including supervised games—daily.

3. *Occupational Therapy.*

In addition to the usual craft activities, available for Closed Ward patients, this shop boasts a complete model electric railway train system. This was built and is operated entirely by patients, under the supervision of a ward attendant who formerly was a closed ward patient. This man was rehabilitated largely because of his participation in this model railway project.

4. *Educational Reconditioning.*

a. *Nature Talks.*

b. *GI Roundtable*, led by Officer patients from Reconditioning Service.

c. *Movies*—GI Movies and Training Films—carefully selected.

d. *Educational Classes* and USAFI courses.

5. *Recreational and Diversional.*

a. *Dancing Classes.*

b. *Piano Lessons.*

c. *Group Singing.* Group Singing is done regularly twice weekly. Closed Ward patients have participated in a hospital-wide musical contest, and have won prizes for their excellent singing and performing.

d. *Game and Play Periods.* These are available in the Closed Ward recreation auditorium several times each week.

e. *Special Entertainment Features.* Through the Red Cross, and Special Services, most USO shows and special entertainment shows are presented for the Closed Ward patients.

f. *Class A Movies.* Shown twice weekly, since these patients are not permitted to attend the Post Theatre.



g. *Panorama*. This is a continuous movie projector, in which a group of short musical pieces are presented over and over. Closed Ward patients seem to enjoy seeing the pictures repeatedly.

h. *Special Red Cross entertainment* on Disturbed Wards. Two Red Cross Recreational Workers go to those Wards where the patients are too sick to leave, and provide special entertainment.

# 6. Visitors.

Closed Ward patients receive visitors in the Social Therapy and Recreation Auditorium only.

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
0900 to 0930	1. Attendance 2. Calisthenics					Inspection
0930 to 1015	1. Orientation 2. G.I. Round-table	Community Sing	Quiz	Bingo	Panel Discussion	Inspection
1020 to 1115	1. Training films 2. Sketching	1. Sports Discussion 2. Sketch.	1. Dancing Class 2. Drill 3. Sketch.	1. Psychotherapy Lecture 2. Sketch.	1. Magician Class 2. Play Period 3. Sketch.	
1300 to 1515	* 1. Occupational Therapy ** 2. Industrial Therapy 3. Educational Classes *** 4. Fatigue					
1530 to 1630	Gym	Gym	Gym	Gym	Gym	

FIGURE 1. OPEN WARD NP SOCIAL THERAPY PROGRAM  
21 MAY THROUGH 26 MAY 1945

\* Occupational Therapy in Ward 38a (Main O.T. Shop).

\*\* Industrial Therapy from 1330-1630 daily, with approval of Ward Officer.

\*\*\* Visiting Hours 1330-1600 daily.

## WEEKLY SCHEDULE

Examples of typical weekly schedules of activities are shown in Fig. 1 (Open Ward) and Fig. 2 (Closed Ward). These schedules include those activities which the Commanding Officer, the Chief of Medical Service, the Chief of the Neuropsychiatric Section, the Chief of Reconditioning Service, and psychologists, feel will be of most therapeutic benefit to the patients. Day-to-day planning, scheduling and supervision are a joint function of the psychologist, Reconditioning Officers, with valuable assistance from Red Cross Recreational Staff, and the patients themselves.



TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
0900 to 0930	1. Calisthenics * 2. Occupational Therapy					
0930 to 1015	Group Sing- ing	Train- ing Films	G.I. Round- table	1. Piano Lessons 2. G.I. Movies	Group Singing (Red Cross)	G.I. Movies
1020 to 1115	G.I. Round- table	1. Bingo 2. Piano Lessons	Dancing Classes	Quiz	G.I. Round- table	G.I. Movies
1300 to 1400	C a l i s t h e n i c s					
1400 to 1530	* 1. Occupational Therapy 2. Gymnasium 3. Visiting Hours ** 4. Red Cross					1. Red Cross Recreation Ward 33B & Ward 34B 2. Visiting Hours
	Wd. 32A & 34A	Wd. 33B & 34B	Wd. 32A & 34A	Wd. 33B & 34A	Wd. 32A & 34A	
1530 to 1630	* Occupational Therapy					
1800 to 2000	Red Cross Recreation Wd. 33B & 34B	Class A Movies Wd. 33A	Birthday Party Red Cross Wd. 33A	Red Cross Recreation Wd. 34B & 32A	Class A Movies Wd. 33A	Red Cross Recreation Wd. 34A & 32A

FIGURE 2. CLOSED WARD NP SOCIAL THERAPY PROGRAM  
21 MAY THROUGH 26 MAY 1945

\* Patients attend O.T. Shop (Bldg. 84) on Ward Officer's prescription. Ward  
Attendance Schedule:

Mon., Wed., Fri., a.m., Ward 32 & 35  
 Mon., Wed., Fri., p.m., Ward 33 & 34  
 Tues., Thurs., Sat., a.m., Ward 33 & 34  
 Tues., Thurs., p.m., Ward 32 & 35

\*\* Visiting Hours 1330-1600 daily.

### SUMMARY

While this program has been carried out completely for less than a year, nevertheless the trends are quite clear. By making available a rich, carefully planned and controlled, participatory activity program, with individual group and mass psychotherapy techniques, it has been found that many patients are being salvaged for further service in the armed forces. For those men who are to be discharged from the service, the program provides maximum rehabilitation, in most cases involving much improvement in, and complete remission of symptoms during the course of treatment at this hospital. It is felt that the Social Therapy Program is making an important contribution to these hopeful tendencies.



## PSYCHOLOGY AND THE WAR: NOTES

*Corporal Harry H. Davis.* Cpl. Harry H. Davis of Medical and Psychological Examining Unit #6 of the AAF's Aviation Psychology Program died 9 August 1945 in an airplane accident at Buckingham Army Air Field, Ft. Myers, Florida. He was on temporary duty with a project of the Department of Psychology, School of Aviation Medicine, involving the collection of gun camera scores as a criterion of gunnery proficiency to be used in validating selection and classification testing procedures.

At the time of his death, Cpl. Davis was acting as psychological observer on B-24 gunnery training missions. He had already completed some 80 missions involving approximately 160 hours of flying. On 9 August Cpl. Davis was scheduled to fly the two morning missions. The first one went off without incident. After the camera film had been shot on the second mission, one of the engines on the B-24 quit, and had to be feathered. The plane came in for an emergency landing, but the pilot made a poor approach, and tried to go around again. The plane went up about 300 feet on the go-around, then stalled and fell straight in, about half a mile beyond the end of the runway. It burned immediately, but a few of the men were pulled out before the fire reached them. One of the 12 men on board survived.

Cpl. Davis was born in Detroit, Michigan, 8 September 1923. Prior to his induction into the army in February, 1943, he studied at the University of Michigan and the University of Cincinnati. After finishing the ASTP course in psychology at the University of Chicago, he was assigned in November 1943 to Medical and Psychological Examining Unit #6 at Keesler Field where he was stationed until his temporary duty assignment at Ft. Myers.

*Terminal Date for NRC Predoctoral Fellowship Applications.* The National Research Council has announced that the terminal date for the receipt of applications for its predoctoral fellowships (see p. 572, Oct. 1945, *Bulletin*) is 1 February 1946. The predoctoral fellowships, amounting to \$1,200 for single and \$1,800 for married students, are available to those whose graduate work in the natural sciences (including psychology) was interrupted by the war.

*What the Soldier Thinks.* Post-war plans of soldiers have led to the publication of a special unclassified issue of *What the Soldier Thinks*. It is based upon a detailed survey conducted at the request of agencies which are preparing to assist soldiers in the transition from military to civilian life after the war. Apply for copies to Director, Information and Education Division, Army Service Forces, Attention: Chief, Research Branch, Room 2E 562, The Pentagon, Washington 25, D. C.



## NOTES AND NEWS

CONSTANTINE FRITHIOF MALMBURG, associate professor of psychology, Illinois State Normal University, died, Oct. 30, at the age of sixty-one years. Dr. Malmberg had served as instructor in education and English (1908-11) and professor of educational psychology (1913-15), Gustavus Adolphus College (St. Peter, Minn.); head of the department of psychology and education (1915-18), Thiel College (Greenville, Pa.); educational director for mental cases (1919-22), Federal Board of Vocational Education; head of the department of psychology and director of the bureau of research (1922-24), Gettysburg, (Pa.) College; and associate professor of psychology (since 1928), Illinois State Normal University.

FRANCIS N. MAXFIELD, professor of psychology, Ohio State University, died, Nov. 10, at the age of sixty-eight years. Dr. Maxfield served as instructor (1912-13) and assistant professor of psychology and assistant director of the psychological clinic (1913-18) at the University of Pennsylvania; as psychologist in the Department of Medical Inspection of the Board of Education, Newark, N. J. (1918-20); and as Director of Special Education in the Pennsylvania State Department of Public Instruction (1920-25). In 1925 he went to Ohio State as professor of clinical psychology.

ERNST THELIN, professor of psychology and director of the psychology laboratory, Syracuse (N. Y.) University, died, Nov. 9, at the age of fifty-seven years. Dr. Thelin served as assistant professor of education, West Virginia Wesleyan College (1922-23); professor of education, Hanover (Ind.) College (1923-24); assistant professor of psychology, University of Cincinnati (1926-27); associate professor of psychology, Florida State College for Women (1927-28); and as associate professor of psychology (1928-38), professor (since 1938), chairman of the department (since 1931), and director of the laboratory (since 1928), Syracuse University.

MARY VANUXEM, psychologist of Lake Mohawk (N. J.), died, Nov. 5, at the age of sixty-four years. Dr. Vanuxem had served as assistant (1915-16), Teachers College, Columbia University; associate supervisor (1916-18), Newark (N. J.) State Normal School; assistant psychologist (1918-20) and head of the department (1920-21), Philadelphia Normal School; consulting psychologist (1920-21), resident psychologist (1921-22), and assistant superintendent and psychologist (1922-42), Laurelton (Pa.) State Village; field secretary, New York State Committee on Mental Hygiene and supervisor of social workers, New York State Selective Service Boards (since 1942).

CLARENCE STONE YOAKUM, dean of the Horace H. Rackham School of Graduate Studies at the University of Michigan, died, Nov. 20, at the age of sixty-six years. Dr. Yoakum served as professor and head of the department of philosophy and psychology at the University of Texas (1908-17); professor of applied psychology and director of the Bureau of Personnel Research, Carnegie Institute of Technology (1919-24); professor of personnel management at Michigan (1924-29); and dean of the college at Northwestern University (1929-30). He returned to Michigan as vice president in charge of educational investigations (1930-35). In 1935 he became dean of the school of graduate studies, a position held along with the vice presidency until 1944, when he resigned the latter to devote full time to the deanship. From 1917 to 1919 he was a major in the U. S. Army psychological service.



WILLARD L. VALENTINE, chairman of the department of psychology at Northwestern University, has been appointed editor of *Science*, the official journal of the American Association for the Advancement of Science, and will assume full charge of the editorial office on Jan. 1, 1946.

LEWIS M. TERMAN of Stanford University, has received a letter from DR. JOSE GERMAIN of the University of Madrid informing him that he has initiated a series of monographs on *Normal Psychology and Pathology* and that contributions from America will be welcome.

HARVEY C. LEHMAN, professor of psychology at Ohio University, has received a Grant-in-Aid from the Social Science Research Council for the year 1945-46 for the completion of a study of the chronological age levels at which men do their best work in various lines of endeavor.

GRAYDON LAVERNE FREEMAN, on leave from his professorship at Northwestern University and with the U. S. Navy, has been awarded a Guggenheim Fellowship for the purpose of completing a book on nervous tension in man. During the war Commander Freeman has served as senior reviewer for officer selection and as a psychotechnical adviser to the Chief of Naval Personnel.

A. W. ALECK, formerly of the School of Education, New York University, has been appointed professor of psychology and education at Huntington College (Montgomery, Ala.).

GORDON V. ANDERSON, formerly acting director of the Student Counseling Bureau of the University of Minnesota, has been appointed assistant professor of psychology at Northwestern University.

RACHEL S. BALL has been appointed assistant professor of psychology and child development, and DOROTHY HELFRICH has been appointed assistant in the department of psychology at Goucher College (Baltimore).

JAMES A. BAYTON has been appointed head of the newly created department of psychology, Southern University (Scotlandville, La.).

The degree of Doctor of Laws was conferred on ALBERT S. BECKHAM on June 6 by Lincoln University (Chester County, Pa.), in recognition of his work on the psychology of minority groups, particularly studies on Negro children.

DELTON C. BEIER, of the psychology research staff, University of Wisconsin, has been appointed assistant professor of psychology, Indiana University.

MARY L. BENSLEY, has been appointed an instructor in psychology in the College of Arts and Sciences, University of Buffalo.

F. KENNETH BERRIEN, associate professor of psychology at Colgate University, has been granted a four-month leave of absence to serve as a research associate at Harvard University. At Harvard he will work on a new course in human relations under the direction of DR. WALLACE B. DONHAM, former dean of Harvard's Graduate School of Business Administration.

RICHARD C. BURTS, formerly assistant dean of students, City College (N. Y.), was recently appointed dean of men and assistant professor of psychology, Denison University (Granville, Ohio).

JAMES C. COLEMAN, formerly of the staff of the University of California (Los Angeles), has been named instructor in psychology at the University of Kansas.

FRANK W. FINGER spoke on the topic *Psychology—the War and After*, at the Autumn meeting of the Virginia chapter of Sigma Xi on Oct. 9, 1945.



E. GUY GREENAWALT, supervising principal of schools, Susquehanna (Pa.), became dean of administration and supervision and professor of psychology, Panzer College of Physical Education (East Orange, N. J.), July 1.

RAYMOND HARTLEY, recently discharged after two years' overseas duty in the Air Forces, has been appointed instructor in psychology, at the University of Kansas.

GEORGE M. HASLERUD, formerly assistant professor of psychology, University of Tennessee, has been appointed associate professor of psychology at the University of New Hampshire.

OMAR C. HELD, Lt. Comdr., D-V(S), USNR, commanding officer of Colgate University Navy units for the past twenty-seven months, has been appointed Dean of the College of Letters and Science at St. Lawrence University, Canton, N. Y. Dr. Held resigned his position as Dean of student personnel and associate professor of psychology at the University of Pittsburgh, from which he was on military leave, to accept the deanship at St. Lawrence.

COMMANDER WILLIAM A. HUNT has been appointed professor of psychology at Northwestern University.

EDWARD S. JONES, dean of students and professor of psychology, the University of Buffalo, has been granted a leave of absence to teach in the Army University Center (Biarritz).

JOHN HALL JONES, has been appointed head of the department of psychology at Howard College (Birmingham, Ala.).

OSCAR J. KAPLAN, associate professor of psychology at the University of Idaho, Southern Branch, has been named to the Advisory Editorial Board of the new established journal of *Gerontology*. ROBERT A. MOORE, professor of pathology at Washington University School of Medicine will serve as Editor-in-Chief. Publication will begin in the first quarter of 1946. Psychologists working in the field of later maturity are invited to submit manuscripts.

STUART D. LOOMIS, formerly of Kemper Military School, has been appointed an instructor in psychology at the University of New Hampshire.

MARGARET MERCER, psychologist, Torrance State Hospital, discussed *New Developments in Psychological Tests* at the eighty-second meeting of the Pennsylvania Mental Hospital Association held at Torrance, October 12, 1945.

WILLIAM I. PAINTER, former head of the department of education and psychology, Shurtleff College (Alton, Ill.), has been appointed assistant professor of education, College of Education, University of Akron.

MILDRED PERCY has been appointed to a lectureship in the department of psychology at George Washington University (Washington).

CARROLL C. PRATT, head of the department of psychology at Rutgers University, has been granted leave of absence to accept an appointment as professor of psychology in the Institute of Philosophy, University of Ankara, Turkey. Professor Pratt will be accompanied by Mrs. Pratt, who has been requested by the Department of State to assist her husband in the study of the history and practice of Turkish music. DR. MUZAFER SHERIF, professor of psychology at the



University of Ankara, is at present in this country on a two-year fellowship granted by the United States Department of State.

ARTHUR L. RAUTMAN, formerly psychologist and supervisor of special education for the Sioux City, Iowa, Public Schools, has been appointed as assistant professor of psychology and education at Carleton College, Northfield, Minn.

ANTONIOS P. SAVIDES, for eighteen years head of the department of psychology, Russell Sage College (Troy, N. Y.), has been named head of the department of psychology, Teacher Training School, Lesley College (Cambridge, Mass.).

MORTON A. SEIDENFELD, who was separated from the U. S. Army as of 15 November 1945, has been appointed Director of Psychological Services of the National Foundation for Infantile Paralysis, 120 Broadway, New York, N. Y.

DOROTHY V. SIMRALL, in process of completing her work for the doctor's degree in the department of psychology of the University of Illinois, has been appointed instructor in psychology at Mt. Holyoke College.

GEORGE S. SPEER, former director, Institute for Counseling, and dean of students, Central YMCA College (Chicago), has been appointed head of the newly established Institute for Psychological Services, Illinois Institute of Technology. The institute will administer and interpret some 2,000 tests, of which 20 to 25 are generally selected for use with the individual to be tested. As part-time counselors, WILLIAM C. KRATHWOHL, professor of mathematics and director of educational tests; DAVID P. BODER, professor of psychology; ERNEST T. WALKER, associate professor of education; and ANNA C. ORCUTT, clinical psychologist, will assist in the guidance of veterans.

ESTHER STRONG, formerly chief counselor of the Navy Department, has been appointed dean of women and associate professor of psychology at the American University (Washington, D. C.).

BAILEY W. WADE has been appointed to a professorship of psychology and education at Austin College (Sherman, Tex.).

Squadron Leader D. J. WILSON was retired from the Royal Canadian Air Force on August 1, 1945, and was appointed as Personnel Consultant to the Canadian Civil Service Commission. He has been granted one year's leave of absence from the University of Western Ontario, London, Canada, where he is associate professor of psychology.

*Proposed Division on Adulthood and Old Age.* A group composed of S. L. Pressey, H. S. Conrad, I. Lorge, H. C. Lehman, G. Lawton, C. Buhler, R. G. Kuhlen, W. R. Miles, and D. Wechsler is urging formation of a Division of Adulthood and Old Age (or similar name) to complement the Division of Childhood and Adolescence and recognize the increasing attention being given to problems of development throughout the life span, and at present especially to the older ages. Any Fellow or Associate of the APA desiring to sign a petition for such a division should so write DR. S. L. PRESSEY, Department of Psychology, Ohio State University, Columbus 10, Ohio.

*Appointments in Psychology at the University of Illinois.* New appointments in the department of psychology of the University of Illinois include the following: RAYMOND B. CATTELL, of Duke University, as research professor of psychology; JESSE B. RHINEHART, of the Ohio State Bureau of Juvenile Research, as assistant professor, and A. J. SMITH, University of California at Los



Angeles, and LESTER LUBORSKY, Duke University, as instructors. Dr. Cattell, who will devote his time entirely to research and graduate instruction, is one of four persons appointed under the new "Distinguished Professorship Fund" set up at Illinois to strengthen the faculty and to provide a new stimulus to creative scholarship and research. Dr. Rhinehart will be in immediate charge of diagnostic and remedial work with children in the psychological clinic (counseling center) of the department of psychology. Promotions made in the department include the following: from assistant professor to associate professor, T. W. HARRELL and L. A. PENNINGTON; from associate to associate professor, L. L. MCQUITT; from instructor to assistant professor, J. T. COWLES. Drs. Harrell, Pennington and Cowles are all resuming active service on the staff of the department after several years of military service. Dr. McQuitty, Lt. Colonel in the Adjutant General's Office, continues on military leave of absence.

*Guidance Department, Teachers College, Columbia.* LAURENCE F. SHAFFER, former professor of psychology, Carnegie Institute of Technology (Pittsburgh), who was recently relieved from active duty as lieutenant colonel and chief of the psychological division, AAF Personnel Distribution Command Headquarters, has been appointed head of the newly established guidance department, Teachers' College, Columbia University. DONALD E. SUPER, associate professor of education will assist in the training of men and women for the increasingly growing field of guidance and vocational adjustment. ESTHER LLOYD-JONES, supervisor of the guidance laboratory, and HENRY D. KITSON, professor of education in immediate charge of courses in vocational counseling, will continue to serve in the expanded and unified work of the department.

The Boston University School of Education during the first semester of 1945-46 sponsored a special course of lectures by distinguished speakers in the fields of psychology and psychiatry. The titles and participants were: Sept. 24, *Problems of Human Behavior*, by HOWARD L. KINGSLEY; Oct. 1, *Some Psychological Factors in Behavior* by VERNON JONES; Oct. 8, *Emotional and Social Problems of School Children* by WILLIAM C. KVARACEUS; Oct. 15, *Categories of Incompetent People* by A. WARREN STEARNS; Oct. 22, *Social treatment and the attitudes of delinquency* by MIRIAM VAN WATERS; Oct. 29, *The Role of Sex in Behavior* by LESTER W. DEARBORN; Nov. 5 and Nov. 12, *The Feeble-minded* by C. STANLEY RAYMOND; Nov. 19, *Physiological Factors in Behavior* by ROSS A. MCFARLAND; Nov. 26, *Research into the Causes of Juvenile Delinquency* by ELEANOR T. GLUECK; Dec. 3, *Behavior as Affected by Mental Disease* by CLARENCE A. BONNER; Dec. 10, *The Prognosis of Neuropsychiatric Disorders of World War II* by LT. COL. JACKSON M. THOMAS; Dec. 17, *Rehabilitation of the Disabled Veteran* by CAPTAIN RALPH O. VAN WATERS; and Jan. 7, a *Clergyman's Views of Mental Hygiene* by CHARLES N. ARBUCKLE.

The Committee on the Severely Handicapped of the National Society for Crippled Children and Adults has prepared a handbook which outlines plans for rehabilitation centers. Individual copies of the handbook are obtainable from MRS. E. SUSAN HENDRICKS, Director, Committee on the Severely Handicapped, National Society for Crippled Children and Adults, Inc., 1222 New Hampshire Avenue, N.W., Washington, D. C.

An annotated *Bibliography on Postwar Readjustment for Service Men and Women*—first complete revision, August 1945, compiled in the Service Command Librarian's Office of the Ninth Services Division, is now available free of charge from the Service Command Librarian, Army Service Forces, Ninth Serv-



ice Command Library Depot, Presidio of San Francisco, California. The subjects included in this bibliography are: reorientation; rehabilitation (general, psychiatric and hospital treatment, training and education); employment; readjustment; organizations and agencies; and bibliographies.

*The Journal "The Nervous Child" Changes Hands.* The journal *The Nervous Child*, has been bought by its founder and Editor-in-Chief, ERNEST HARMS, from its previous owner, Grune & Stratton Medical Publishers of New York City and from now on will be produced by a new publishing house, Child Care Publications, 30 West 58th Street, New York 19, N. Y. During 1946 this house will issue another periodical entitled *The Journal of Child Psychiatry*, devoted to unsolicited contributions in the field of mental disease in childhood.

*Social Science Research Council Fellowships and Awards for 1946-47.* The Social Science Research Council has announced the following offerings of the year 1946-47: 1. *Pre-Doctoral Field Fellowships*, open to men and women under 30 years of age who have completed their courses and examinations but not their theses for the Ph.D. degree. Through field work these awards aim to give opportunities for obtaining a realistic basis for the dissertation and subsequent research. Appointment will be for not less than 9 nor more than 12 months with the basic stipend \$1,800 for 12 months. Applications on blanks secured from the Secretary of the Committee are to be submitted by Feb. 1, 1946, with awards announced Apr. 15, 1946. 2. *Post-Doctoral Research Training Fellowships*, open to men and women with the Ph.D. or its equivalent in training and experience and who, ordinarily, are not over 35 years of age. Their purpose is to broaden the research training and equipment of promising young social scientists. The basic stipend for 12 months is \$1,800 for single and \$2,500 for married Fellows, with supplementary allowances for dependents, and travel. Awards are usually for 12 months, but may be made for any period not exceeding two years. Applications on blanks secured from the Secretary of the Committee are to be submitted by Feb. 1, 1946, with awards announced Apr. 15, 1946. 3. *Grants-in-Aid of Research*, are available to mature scholars without reference to age whose capacity for productive research has been demonstrated by published work. The maximum amount ordinarily granted will not exceed \$1,000. The closing date for application on forms secured from the Secretary is Jan. 15, 1946, with grants announced Apr. 1, 1946. 4. *Demobilization Awards*, for the support of either training or research projects, will be made only to social scientists of exceptional promise whose careers have been seriously disrupted by service in the armed forces or other services. The amount of the stipend will be determined by the committee in terms of individual needs. In general, the Council will, on its own initiative, seek to discover individuals of the greatest promise. Recommendations of such individuals will be welcomed. Address communications with regard to fellowships and grants to LAURA BARRETT, Secretary to the Committees, 230 Park Ave., New York 17, N. Y. and regarding demobilization awards to ELBRIDGE SIBLEY, Secretary for Fellowships and Grants-in-Aid, 726 Jackson Place, N.W., Washington 6, D. C.

*Internship in Clinical Psychology at McLean Hospital.* An internship in clinical psychology is open to persons with a Bachelor's degree in psychology. Some experience in testing or applied psychology is desirable. An intern can carry courses in one of the universities in the metropolitan area of Boston. Emphasis will be placed on techniques of diagnosing personality under the supervision of FREDERICK WYATT. Applications should go to DR. W. FRANKLIN WOOD, Director, McLean Hospital, Waverly 79, Mass.



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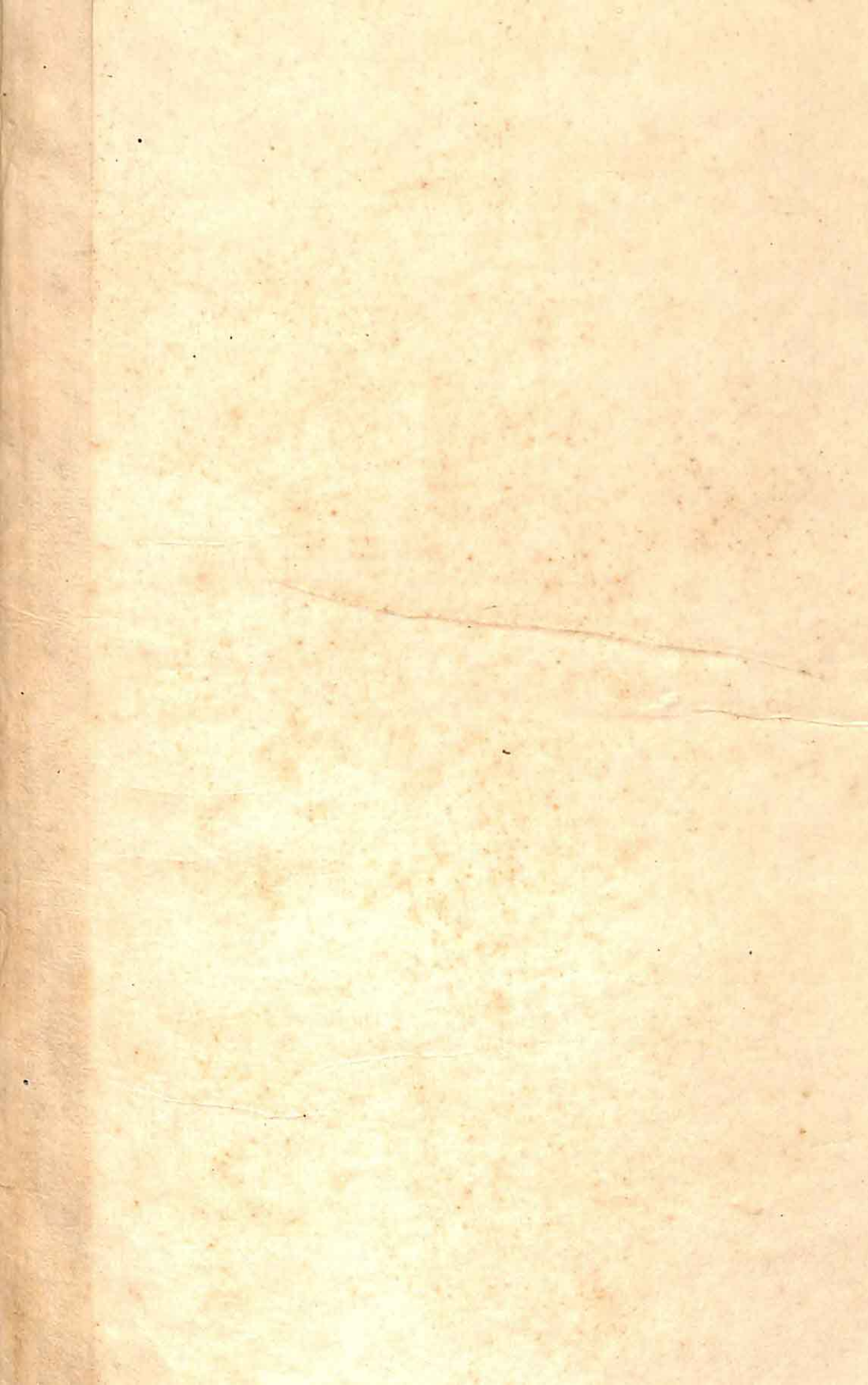














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